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THE PLATEAU OF BRITISH EAST AFRICA
AND ITS INHABITANTS

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COASTAL PLAIN

The British East Africa Protectorate, like all of the contiguous territory, is a great plateau which averages several thousand feet above sea level. The plateau is fronted by a narrow coastal plain of uplifted coral rock, porous and brecciated in character, and reduced by marine erosion to a flat, featureless plain. The plain varies in width from two to ten miles and on the average is about thirty feet above the sea. It is covered by a thin residual soil on which a tropical jungle subsists. Bird and animal life is abundant and in certain small areas the plain is thronged with natives. The shore line of this plain is relatively smooth, and consists of low cliffs alternating with beaches of coralline sand. A number of minor oscillations have affected the coast belt in recent geological time, the last of these movements being a negative one, resulting in the drowning of stream debouchures and the consequent formation of wide and irregular estuaries. These estuaries, or so-called lagoons, cause most of the irregularities in the coast line, and give rise to the only safe type of harbor to be found on the east coast of Africa. Kilindini harbor, at the south end of Mombasa island, one of the most commodious and splendid harbors in the world, results, for example, from the drowning of several small streams which enter the sea in close proximity.

The east coast of Africa is one of the world's great coral regions. The coast pilots say that, with a few interruptions, such as that off the mouth of the Zambesi river, the coral extends from Somaliland southward to the neighborhood of Delagoa Bay, a distance of over 2,000 miles. Reefs obstruct the entrances to all harbors to such an extent that access is generally difficult, and thus the prosperity of the whole region is seriously menaced. Both fringing and barrier reefs are in process of formation in great numbers off the East African coast. In general they lie parallel to the shore, and in many instances have been built up to the surface of the water, so that sand is accu-



FIG. 1.—British East Africa.

mulating upon them. This is true of barrier reefs several miles from shore, as may be seen between Zanzibar and Mombasa. A slight elevation of the sea bottom would extend the coastal plan seaward for several miles.

The coastal plain is well adapted for agriculture, especially fruit raising, when once it is cleared of the forest covering. The natives have in many instances thus cleared small patches or shambas for the purpose of supplying the native markets with various products of the soil. Nevertheless, the population is still small and the resources of the plain are poorly developed. For example, Mombasa,

the most important port of East Africa, has been for centuries a center of trade and of Arab and European influence, yet it is still possible to shoot buffalo, elephants and other forms of large game within a radius of eight or ten miles of this long settled community.

PEOPLE OF THE COASTAL PLAIN

Arabs and Indians have succeeded in securing the most desirable agricultural areas and have dispossessed the weaker and less intelligent negro native and forced him into other types of employment. The negro is not the only one, however, who is losing ground. The Arab, who has been in the land for centuries, is being steadily and mercilessly displaced by Goanese and East Indians, who are coming to British East Africa in large numbers. An interesting transference of allegiance from the old Arab master to the new and more resourceful Hindu master is taking place at the present day.

It is a pity from many standpoints that the unscrupulous though skillful Indian has come to East Africa in such numbers. The negro is adjusted to the Arab, his ideas and his methods, he knows how to accept him and what to expect from him. He is yet to be adjusted to this new human environment, and what the outcome of this new relationship is to be is now difficult to predict. The Indian is but a careless and indifferent workman and serious complaint of his inefficiency and slovenliness is to be heard all along the Uganda railroad, where he is largely employed. This sort of an example is bad for the negro. The Indian is not the kind of civilizer the native needs in his present stage of development. The forced contact of the two races in the last decade or two has raised a serious problem for the British Government.

Most of the natives who live on the coastal plain are Swahilis of mixed Negro and Arab descent. Although the Arab has been a curse to the African, yet in many ways he has been a blessing, even though it be in disguise. For example, he has changed the coast negro from a dirty, inefficient savage to a well clothed, law abiding, resourceful laborer. The Swahili, to quite a degree, has dropped his Mumbo-Jumbo religion, his fetishism and his charms and has taken on, outwardly at least, a more advanced type of religion in the form of Mohammedanism. The change, however, is in many ways only skin deep. It is rare, for instance, to see a native praying with his face Mecca-ward or in any other direction, as compared with his Arab or Indian neighbor, yet even thus he has advanced religiously, thanks to his Arab mentors. The coast Swahili has in many ways adapted himself to sea conditions. For instance, he is a good navi-

gator and boatman, and a great fisherman. As a natural result he is employed frequently on the liners plying between East Africa and Europe or India. The infusion of Arab blood in his veins has apparently given him certain qualities of leadership and of organization, as well as certain commercial tendencies, which are largely wanting in the timid, unaggressive native of the interior. The Swahili language has borrowed an extensive vocabulary from the Arabic, and has become the *lingua franca* of East Africa, indispensable to all who travel or trade in that land. The Swahili is thus at a great advantage over other natives, and has therefore become a



FIG. 2.—In the Native Village. Mombasa.

necessary factor in the organization of safaris, or expeditions into the interior, and in much of the native commerce of the country.

The houses of the natives on the coastal plain illustrate not alone the characteristics of their architecture but show how the native is able to use whatever material happens to be at hand. The houses consist of a frame-work of poles tied together with bark. The space between the poles is filled in with mud and fragments of coral rock, while the roof is thatched with leaves obtained from the groves that surround the habitations. Almost the only article of furniture is the bed, a rectangular frame of poles placed on four legs, with native cord stretched across at intervals much after the fashion of the old cord beds of our fathers.

What has been said above applies only to certain parts of the coastal plain. Many portions are not inhabited save by wandering

tribes, who stay but a few days in any given locality. Except on the sea coast and along the Uganda railway and the old caravan routes, much of the plain is a real *terra incognita*.

THE PLATEAU

The plateau rises from the coastal plain somewhat abruptly to a height of 200 feet, then, by a gradient which is on the whole more gradual, to a height of 8,000 to 10,000 feet at the crest of the escarpment on the western side of the Rift Valley, 450 miles from the Indian ocean. From this lofty summit there is an abrupt descent into the Nile basin, for it is to be remembered that the Nile valley is carved out of this great plateau.

The rainfall over much of the region under discussion is variable and scanty. It comes in two seasons, separated by months of dry weather. The "Big rains" fall from March to June, when the movement of the sun carries the belt of equatorial rains northward, the "Little rains" in November and December, when the sun returns to the south of the equator. The drought of the dry months is so serious, that it outweighs the good results of the rains. Vegetation, though abundant, is a stunted, scrub-like growth of an arid type. It has of necessity adjusted itself to the dry seasons rather than the humid portions of the year.

Exceptions to this general statement regarding rainfall are found along a narrow belt on the coast, where for a few miles inland the rains are fairly well distributed through the year by reason of the trade winds. Again, the loftier parts of the high plateau, those portions above 5,000 feet or so, are likely to receive more rain than the lower areas. The higher monadnocks of the plateau, which will be described later, receive quite abundant rains on their summit, even when comparatively little falls at the base. The higher portions of the plateau in the neighborhood of the Rift Valley are also well watered, insomuch that great forests grow there in tropical luxuriance, forming a marked contrast to the scrub-covered plains only a few miles away. Finally, the western slopes of the plateau receive the heaviest rainfall, about sixty inches per annum. This fact accounts in large part for the tremendous erosion which has taken place here and which has resulted in the development of the Victoria Nyanza Basin and the Nile Valley that opens from it to the north. This great precipitation is due apparently to moisture laden winds which follow up the Congo Basin from the Atlantic. As they are carried up the westward face of the plateau and over its lofty summits they precipitate their contents in the form of frequent showers.

This circumstance is apparently a large factor in maintaining the Nile and in determining the position of its valley.

Except in the regions just described, the rainfall is so scanty that no well-defined drainage systems can be maintained. Over the larger part of the plateau the streams are intermittent, flowing in wide, shallow valleys. There are no deep valleys, no cañons, no well-incised ravines, no trunk stream flowing permanently into the sea.

On the basis of the underlying terranes and their character, the plateau may be divided into a number of provinces. These provinces are long and comparatively narrow regions, extending in a northerly-southerly direction. The easternmost province, adjoining the coastal plain along the Indian ocean, is underlain by sedimentary rocks. It



FIG. 3.—Swahilis at a railroad station.

represents an earlier coastal plain, which in late Jurassic time was uplifted from the sea and has been carried to its present altitude of several hundred feet by a number of oscillatory movements. The shales and sandstones of the area are easily eroded, and where there is much rainfall the region is thoroughly dissected, presenting numerous hills and valleys with notable relief.

As one proceeds westward, the shambas, or cultivated plots of cocoanut and banana, which are abundant in this seaward province, are left behind, and an open, park-like country follows. This region is gently rolling, and is covered with grass, a good pasture-land, where many flocks of native cattle and goats, and at times herds of game, are browsing. Still further westward, but nevertheless only

thirty miles from the sea, the rainfall begins to be less, and the flat, monotonous country is covered with thickets of scrub, uninhabited either by man or beast.

The next province is underlaid by a gneiss, which is the foundation rock of the whole plateau. This province is about 200 miles wide, and is a well-dissected area with numerous residual monadnocks, which rise to a height of 2,000 or 2,500 feet above the plain. These residuals usually trend parallel to the foliation of the gneiss, namely N.N.W.-S.S.E. Some of the larger monadnocks rise to the dignity of mountain ranges. They are lofty and massive features of the landscape, whose summits are sometimes clothed by forests among which dwell tribes of agricultural negroes. The plains below



FIG. 4.—Native House in the Making. Makindu.

are flat, dry, débris-laden areas covered with thorny mimosas, *Euphorbias* and other types of arid vegetation. Numerous lava flows cover parts of the gneissic area, and are often of such great extent as to have a marked influence upon the topography. They frequently form angular, flat-topped buttes and mesas, while the gneissic remnants, that is, the monadnocks, are usually ridges with undulatory summits.

Toward the west the gneiss begins to be covered by vast and continuous lava flows from the Rift Valley, and their presence introduces another province, which may be called the Lava province. Originally the gneissic province extended from the ocean at least to the shores of Victoria Nyanza, but the portion now under discus-

sion is buried to a greater or less depth by lava. Some of the earlier flows were relatively thin and were guided largely by the original gneiss slopes. In such instances the lava barely masks the older surface, as is seen, for example, in such striking examples as the wide, flat expanses of the Kapiti and Athi plains. The Lava province is about 220 miles in width. Its middle portion is interrupted by that vast graben known as the Rift Valley. The lava seems to prevail throughout the entire Rift, the formation of that valley having caused in part the extravasation of the lava which has poured forth in such abundance on either side. If the lavas exist in such quantities throughout the length of the Rift, as they do in British East Africa, then this belt is by far the most extensive lava area on the globe.

THE RIFT VALLEY

The Rift Valley is a great trough fault which trends from north to south through the lava belt. It is the most stupendous feature of its kind on the globe. A first view of it from the edge of one of the escarpments is never to be forgotten as it spreads out before the observer in all its vastness and mystery. Its maximum depth below the plateau is about 2,000 feet. Its width from east to west, where the Uganda railroad crosses it, is about eighty miles, while the floor averages perhaps forty miles in width. The walls of the valley consist of a series of scarps and platforms, caused by the movements of great fault blocks which have pitched about in various directions in the effort to adjust themselves to the sinking crust. The number of scarps varies; sometimes there are but two, more commonly three, rarely four or more. The scarps are generally several hundred feet high and are somewhat modified by erosion, especially on the west side of the valley, where the rainfall is greater. The essential features of the valley sides are, however, due to the movements of the great fault blocks themselves. The blocks may reach a length of several miles and a width of a mile or so. The varying size of the blocks and their different inclinations introduce a diverse topography in which faulting is the sole factor. The upper scarps and platforms are covered with tropical forests, while the floor and the lower scarps, in marked contrast, are scantily covered with arid vegetation, so great is the difference in rainfall between the upper and lower wall of the valley. The floor of the Rift is made up of a series of basins, probably of tectonic origin, and containing in some cases alkaline lakes. The valley, as a whole, is an area of accumulation; no streams drain it outwardly and no débris passes from it. Great quantities

of detritus are swept into it from the encompassing walls in the form of fans, whose material is gradually spread out over the floor and results in its aggradation.

A lofty but relatively narrow divide separates the Rift from the Nile basin. As already indicated, this region is being attacked by erosion on its west face in a very marked way and is destined to disappear in a short time, geologically speaking. With the divide removed, the drainage of the Rift will be added to that of the Nile, its aridity will disappear and a large region become fitted for human occupation.

THE PEOPLE OF THE PLATEAU

For the most part the natives of the plateau have a less admixture of foreign blood than the coast natives, and are therefore of



FIG. 5—Railroad Laborers on Work Train.

relatively pure negro stock. Generally, they are agriculturists and work the soil in their careless, improvident way. Over much of the plateau, with the exceptions already noted, the rainfall is too scanty and fluctuating to afford certainty in agricultural operations. Hence, there are large areas of the plateau which are uninhabited by permanent peoples; for the natives are forced to occupy the higher hills and the loftier parts of the plateau, where rainfall is more abundant. The Duruma tribe, for example, live on the higher summits of the Sagala hills south-west of Voi, and they manage to live in comfort, but would starve to death on the arid plains below. It is sometimes hinted by travelers that this withdrawal has been due to fear of

slave-raiders, but in any case they would be obliged to live on the heights, where the needful rainfall is sufficient. Thus, too, the Kikuyu tribe occupy the high plateau about Nairobi and to the westward, toward the Rift Valley, where rainfall is abundant and assures them the needed food supply. This family is typical of the agricultural or "Hoe-people" group. They cultivate shambas of a few acres in extent, upon which they raise corn, yams, manioc, millet, ground-nuts, bananas, etc. The women do much of the rough work, turning up the ground with their rude mattock-like hoes and harvesting the crop at the end. Generally, there is a baby fastened on each woman's back, its poor little head rolling too and fro with the motions of the mother as she bends to her arduous toil, while its face is



FIG. 6—Chicken Peddlers and a Native Policeman at Nairobi.

covered with dust, perspiration and flies. The harvested crop is frequently kept in small, grass-thatched granaries. As soon as the harvest is reaped the land is burned over to rid it of weeds and then planted almost immediately to a new crop.

There is little rotation of crops, and little fertilizing of the land, so that the soil is overworked and soon depleted. When it has lost its fertility and fails to produce an average crop, the native abandons his shamba and seeks new quarters. He may locate on the grasslands or he may clear another patch in the forest. Apparently this method of procedure has been carried on from time immemorial. Generation after generation has gone about depleting the land until large areas have become unfit for agricultural operations. The

gneissic nature of the underlying rock, over wide regions, also tends to make the soil acidic in character and somewhat infertile at best, and the native methods only add to its natural poverty.

The Kikuyu is very adaptable, he knows how to make use of branches, leaves or grass in forming a cover and he is able in short order to construct a bee hive hut, which will serve as a shelter while he needs it. Especially in the forest regions, numerous grass covered huts, singly or in groups, are to be seen. There is no opening into the hut except the low door, which compels crawling in on all fours. The Kikuyu is a master of circumstance in his own environment and is able to meet situations effectively, where a white man would be helpless. In a similar way he adjusts himself to the



FIG. 7.—Gneiss Monadnock near Voi.

use of all types of foods, cooked or uncooked, clean or unclean; everything is grist that comes to his hopper. He will dig up a manioc root, knock off the dirt, gnaw off the cortex, spit it out, then proceed to eat the root in a raw state. On the other hand, he may make more elaborate preparations, he may utilize the native mortars to pound up corn or millet into a coarse meal, from which he may make a native bread or eat it in the form of mush. On the whole, he is one of the most industrious among African peoples.

The natives of the interior wear little clothing as a rule. When they have been converted to Mohammedanism they wear the long flowing robes of the Arabian, or if they are anglicized they may don the cast off knee-breeches and sweaters of their erstwhile masters.

The ordinary heathen, however, wears a piece of cotton cloth tied over one shoulder and allowed to drape itself about the body as it will. He daubs his cloth with grease and red clay to make it water proof. In the same way he smears over his body a mixture of tallow and clay, including head and hair. This coloring matter is rarely put on in the form of a pattern and is not intended, solely, at least, for purposes of ornament, but rather for the utilitarian object of protection from heat and insects.

Ear ornamentation is the most notable type of personal adornment among the natives of the plateau. Both the shell of the ear and the lobe are loaded down with all sorts of materials, wood, metal, paper, and stone. The lobe of the ear is pierced and then stretched until it will admit a stone weighing several ounces or even a jam can. Sticks and cigarettes are thrust into the holes bored around the shell of the ear. In walking through the country, especially in the neighborhood of the Uganda railroad, one frequently meets groups of these natives adorned in this way and armed with spears and clubs. Generally, they pass in silence, but occasionally some one will call out the native salutation "Hujambo Bwana," which being interpreted is "How do you do, master."

An entirely different type of native inhabits the Rift Valley, namely, the Masai, a Nilotic people, who have pushed their way up the Rift and wedged themselves in between the negro tribes of the uplands. The valley has been a great highway up which they could travel far from their origin. Like a river, this mixed people has swept southward, between banks of negroes as it were, on either hand.

The Masai are a pastoral race and the semi-arid valley is well adapted to their mode of life. Though they have negro blood in their veins, they are very unlike the surrounding agricultural Bantus. This is noticeable in their physique, habits of life, customs, modes of building and the like. For example, they do not build the grass hut of the upland negro, but use a type of house better fitted for a cattle raising people. First of all, a great enclosure of palings is constructed, within which they build their crude brush huts. These are wretched homes, much more exposed than the negro huts, and far inferior to them from the standpoint of construction, but they are well ventilated and the smoke freely escapes. Within the large enclosure the flocks are driven at night as a measure of protection against wild beasts. One of the common sights about these kraals in the morning hours is to see women busy at work repairing the fence or rebuilding decadent portions of it.

In their methods of ornamentation, the Masai tend to use skins, tails and horns of animals, as befits a pastoral people. They are not averse to the chase and with their long-headed iron spears are able to hold their own even with lion or leopard.

The Rift Valley has had a marked influence upon the distribution of this race, and the accident of a geological convulsion has permitted them to go far afield and to be brought closely into contact with a contrasting people. It is rarely the case that conditions will permit two peoples to be brought into such close contact unless one is dispossessing the other and pushing its way onward at the expense of the other. Here in East Africa these two unlike races dwell side by side because each has its own appropriate environment. They



FIG. 8—Fault Escarpments. Rift Valley.

do not need to invade each other's territory since a geological accident has caused the juxtaposition of two regions in which unlike peoples can dwell without interfering seriously with each other. In some cases, as among the Lumbwa, the Masai have overflowed the banks of the valley and settled on the higher plateau, but these are exceptional instances.

Within the Victoria Nyanza basin, to the west of the Rift Valley, conditions again favor agriculture, and here dwell numerous tribes who make their living from the soil. Some of them, like the Kavirondo, are unique beyond degree, well worthy of study from the viewpoint of the geographer, both in their relation to the land and in regard to their utilization of the products which nature has offered

them. These peoples, like all those on the great African plateau, illustrate anew the truth, that all aborigines are adjusted to their surroundings as accurately and efficiently as the fauna and flora, in whose midst they dwell. They are the survivors who have proven their fitness to live and to people the land.

TOPOLOGY, TOPOGRAPHY AND TOPOMETRY

BY

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The recent discussion in the "Annales de Géographie" between Prof. Paul Girardin and Général Berthaut on the concepts of Topology, Topography, and Topometry,* following upon the publication of Berthaut's two-volume work entitled "Topologie," seems of sufficient importance to deserve being brought to the attention of American geographers, topographers, and engineers. In this country we still content ourselves with the single term "topography," applying the same rather loosely, and in some respects inaptly, to different classes of work. The truth is that we have not yet come to separate sharply in our minds the three closely allied concepts for which the French have already for several years found it desirable to employ different terms.

The topographic map work carried on in this country, principally by the government, is recognizedly of a high order, and appreciation of its merit has been repeatedly expressed by European topographers. Nevertheless, the fact remains that we have in the United States no distinct "topographic profession," nor anything resembling a formulated science of topography. With us, topographic mapping, however excellent its results, is little more than a specialized class of surveying and drafting, and our topographers do not, on the whole, lay claim to being anything further than specially trained surveyors and draftsmen. To those familiar with the trend of geologic, and more especially of geographic science, in this country, however, it must be clear that if the topographer intends in the future to keep step with the geologist and the geographer; if the mapmaker's work

* Paul Girardin, *Topologie et Topographie*. A propos de l'ouvrage de Gén. Berthaut, *Ann. de Géogr.* Vol. XX, Nov. 15, 1911, pp. 385-395.

Gén. Berthaut, *Topologie, Topographie et Topométrie*, *ibid.*, Vol. XXI, Jan. 15, 1912, pp. 73-80.

is to continue adequately to meet the constantly more exacting requirements of the map user, then the time is not far distant when the former will have seriously to consider placing his work on a higher and more scientific plane. It will not suffice for him merely to keep on increasing the accuracy of his measurements and the skill of his hand. However essential surveying control, so-called, and drafting skill may be, they are not the "Alpha and Omega" of topographic mapping. What the topographer will have to do, sooner or later, is to acquire an insight into the nature of land forms, and to systematize this knowledge so that it will provide him with a definite basis for the planning of the engineering parts of his work. It is only in this way that he will be able to furnish without fail, or without preliminary and costly experimenting, the data required in any instance with the precision demanded and yet with true economy.

It was with this idea in mind that the writer, some six years ago, addressed himself to the task of working out, at least tentatively, a general groundwork upon which such a system of rationalized topography might be built. An essential part of that groundwork appeared to be a classification of detail forms, "topographic units," as the writer has frequently called them ("Einzelförme," is the German word), the delineation of which constitutes the topographer's principal work. An outline of this classification he presented before the Association of American Geographers, at the Baltimore meeting, under the title of "The Topographer's A B C of Land Forms."

It occurred to him at the outset that this study, although resting chiefly on physiography, constitutes a field of inquiry distinct from that science and not to be confused with it. It is inherently a topographer's study, and its object is a purely topographic one. In seeking a name by which to designate the new science, the desirability at once suggested itself of finding a term that might stand in apposition to that of "topography," which denotes the corresponding art. "Topology" manifestly was the logical word, but when the writer opened the Century Dictionary to see if the term might possibly be in use elsewhere, what was his dismay to discover that "topology" stands for "the art or method of assisting the memory by associating the thing, or subject, to be remembered with some place." Considering the term definitely preëmpted, he closed the book with a sigh and began to look in other directions for a convenient word,—thus far, however, without success. One may imagine his delight, therefore, upon finding upon his desk one day two ponderous tomes in French proudly bearing the one-word title "Topologie," and treating of the very science for which he had himself selected that term.

"A la bonheur!" he exclaimed, "that settles it!" We may incur the wrath of the mnemonician by thus appropriating his term, perhaps, but what of that, there are not many of him in the land. Besides, it is not the first instance on record of a term being used in utterly different meanings by separate sciences whose provinces are so widely remote from one another that there cannot possibly ever be a clash.

In the meanwhile "topologie" has been in use among French topographers these ten years, and bids fair to stay. Let us hope it may. There is need of such a term. The new science for which it stands, but barely out of the egg, needs careful nurturing, and the first step required to establish it and secure it recognition is to give it a name coupled with a definition. Berthaut's definition, as given in the foreword to his work on "Topologie," is: "Nous entendons par *topologie* l'étude raisonnée des formes topographiques;" the analytical study of topographic forms, to give a close translation. This he hastens to amplify by saying that the land forms referred to are not those larger ones constituting broad areal units of geographic importance, but those minor ones whose delineation requires fairly large scales of mapping, topographic scales rather than geographic scales. Topology is essentially a detail study, which, while it may be conceived to lie within the province of physiography (*géographie physique*, as it is termed in France), nevertheless comprises a separate field having a specific object. In his reply to Girardin, Berthaut states what that object is: "The principal object of topology, as conceived by the Service Géographique de l'Armée, is to furnish the topographer with the analytical elements of the forms of the relief, for the more thoroughly these forms are understood by the topographer the more successful will he be in their delineation. Reciprocally, the better the land forms have been delineated by a topographer, who knew how to bring out their characteristics, the more valuable will his topographic document be in shedding light upon the nature of the relief, the underlying structure, the erosional forces to which these structures have been exposed, etc.—all information of an implicit sort, which will be eagerly seized upon by those able to read it."

To all this the present writer promptly responds with a hearty, loud amen! His own experience has abundantly proven the soundness of Berthaut's contentions. No topographer who would aspire to give maximum value to his work, can hope to do so if he lacks an intelligent insight into the nature of land forms. Let there be no illusion on this score; the lack of intelligent understanding on the part of the uninformed delineator speaks from every line he draws;

it betrays itself in the meaningless, wooden forms that characterize his sketches, in the evident crudeness of his conceptions of nature's work. These defects may pass unnoticed by the undiscerning, but they are nothing short of galling to those to whom every curve and flexure in a contour has a meaning,—and it is just these who in their own research most rely upon and most heartily appreciate good topography.

A few topographers there are, no doubt, with whom an understanding of the relief is intuitive, but with the rank and file such is certainly not the case. For them, the only way to acquire an understanding is by patient study and close observation. Unfortunately, hitherto, there has been no book treating the subject of topographic forms in a manner specially designed to meet their needs. Well-meaning attempts have been made in this country, at one time or another, to supply the topographer with lessons in pure geology. But geology is not what he needs, and the aforesaid attempts have only resulted thus far in intensifying his prejudice against that science, a prejudice that may be likened to the loathing displayed by high school girls to algebra and other studies which they instinctively feel to be foreign to and useless in the sphere of their future activities. It is sincerely to be hoped, now that Berthaut's "Topologie" has given a new impetus to the study of land forms by French topographers, that a similar work may soon appear on this side of the Atlantic for the inspiration of American topographers. Such a work might well go one step further than Berthaut's, and, besides explaining the genesis of the different topographic types, attempt to lay down some principles governing the generalizing and simplifying of minor details, not fully delineable on small scale maps. How this generalizing is to be effected, and how far it is to be carried in any instance, are problems that inevitably confront the topographer who is working on much reduced scales; indeed, they are among the most perplexing problems with which he has to deal. Thus far he has been left to solve them for himself, but the unsatisfactoriness of the result must be obvious to any one who has noted the wide diversities in style of treatment so often characterizing maps drawn by different men. In topographic delineation, as in writing, generalizing is largely a matter of judgment not amenable to rigid rule, and there must always be some room for the expression of individuality. But this is not equivalent to saying that it is impossible to minimize these differences in treatment, or that it is utterly useless, as some would claim, to try to formulate principles that will tend to unify the practice. On the contrary, the divergence

in judgment shown by different delineators plainly indicates that the topographic art is still largely on an empirical basis, that its fundamentals have not yet been worked out, and that much could be done to guide the individual in his judgment. As a matter of fact there do exist certain basic principles for the generalizing of topographic details on maps of different scales, and it is high time that they be announced, so that there may be a uniform understanding of them among all topographers.

There are those, no doubt, who will reply to all this that topographic mapping, in the end, is nothing but a matter of engineering, and that the topographer merely need multiply his measurements in order to obtain a representation that will be accurate and reliable throughout. But this view rests upon a misconception, a failure to distinguish between maps, the limitations of whose scales preclude the rendering of the relief feature for feature, down to the merest minutiae, and those large-scale maps upon which not merely all features can be delineated in detail, but upon which these features are measured in with mathematical accuracy, practically nothing being "sketched in" by eye. The French have long since recognized the desirability of differentiating between these two classes of maps, designating the latter "topometric maps," while reserving for the former the old term "topographic maps." Topometric maps, accordingly, are maps of high precision. The contour lines upon them are in many instances run out individually by instrumental methods, and the forms of the land are treated in the same rigorous fashion as roads, fences and other cultural features. Indeed, such maps are little else than high-grade surveyor's plats, aiming to furnish a representation of the ground sufficiently accurate for the planning of engineering works and the making of preliminary estimates. They are, of course, prepared on relatively large scales, such as 1:20,000, 1:10,000, 1:1,000 and larger.

Clearly such maps belong to a different category from those properly called topographic, whose aim it is to portray considerable areas of land with their characteristic configurations. These do not pretend to be exact replicas of the relief in miniature,—rather, they partake of the nature of abstracts,—generalized statements serving to bring out essentials, at the sacrifice, purposely, of irrelevant detail. Among the most familiar examples of this type of map are the topographic atlas sheets issued by the U. S. Geological Survey (special large-scale maps, such as those of the Yazoo Basin in Mississippi, for instance, excepted, to which the term topometric rightfully applies). The scales of the atlas sheets are for the most part 1:62,500,

1:125,000, 1:250,000, but there are a few instances where larger scales have been used, such as 1:48,000, 1:31,680, and 1:24,000. In Europe the prevailing scales are 1:20,000, 1:50,000, 1:100,000, and 1:200,000.

It stands to reason that there can be no sharp line of demarcation between topographic and topometric maps; the two naturally grade into each other. There is often a little topographic sketching on a topometric map, as in the more rugged portions of the large-scale Sacramento Valley sheets; again, there is of necessity much topometric work involved in the preparation of a high-grade topographic map. Nevertheless the distinction is a useful one, and could it only become as firmly rooted in the minds of our geographers and engineers, as it is with their French brethren, the haziness of ideas still prevailing in this country on the subject of topographic mapping would soon be dispelled. There would come to be a truer appreciation of the difference in status of the two kinds of map work and of the two professions which they represent. It would become clear, on the one hand, that topometry is essentially a branch of engineering, involving surveying and drafting of a specialized sort, and that the value of a topometric map is to be gauged primarily by its quantitative exactness. It would be recognized, on the other hand, that topography is something more than engineering, requiring for its best results a technical equipment far beyond the training surveyors or draftsmen ordinarily command. There would cease to be any further illusion about the province of topography, which is the presentation of topographic facts in condensed form; nor about its nature, which is in part that of an interpretative and synthetic art. Finally, it would be granted that there can be no hope for anything like uniform and systematic delineation until the science of land forms—topology—has been formulated and all topographers alike shall be schooled in its principles.

Whether or no we care to adopt in this country the two new terms topology and topometry, we shall hardly err in taking cognizance of the concepts for which they stand, and in thus vitalizing our own thought in the domain of topography and topographic science.

THE TECHNIQUE OF ARCTIC WINTER TRAVEL*

BY

V. STEFÄNSSON

It is a world rule (with its inevitable exceptions) that the members of a craft hand over to their fellow-craftsmen and successors the knowledge gained by experience and the wisdom that comes from failure. Among the conspicuous exceptions to the rule are arctic travelers. A farmer who finds an expensive fertilizer inferior to a cheaper one usually writes a letter forthwith to an agricultural journal, but a traveler who finds the sleds used by the distinguished traveler X decidedly inferior to those sold to "mushers" at Nome ordinarily refrains from saying a word about it—probably for one of three reasons: he wants to keep the knowledge for his own exclusive benefit, he is afraid of offending the distinguished X, or his publisher hints broadly that the man in the street prefers rhapsodies on polar sunsets and December auroras to technical discussions of carpentry. Accordingly a reading of modern arctic books from Parry to Peary is of disappointingly little value to one seeking light on the technique of snow and ice travel. This statement requires some qualification, however, for is there not Julius Payer with an entire chapter of "practical suggestions," and do we not have minutiae of sled-building and sled-loading in Nansen's delightful "Farthest North"? There are suggestions, too, by Greely and by Rae, and by several others; there is much wisdom with Peary if one reads between the lines. But it is only to the man of experience that this interlineation is legible, and it is the man without experience who most needs the advice, for it has been true in the past, and will probably hold for the future, that half of the more pretentious polar expeditions are commanded by men without experience who do not suspect the trials that await them and who are so completely discredited by the failure of their first venture that they do not get a second chance to retrieve their fortunes and profit by their failure, even when they do not pay with their lives for their lack of knowledge and for their misknowledge.

* The author wishes it stated that, when this paper was written, he had no opportunity of knowing of the publication of Peary's "The North Pole" or of consulting it with reference to the technique of arctic travel.

Attention may be called to a former contribution by the author, entitled "Suitability of Eskimo Methods of Winter Travel in Scientific Exploration," in the *Bulletin*, Vol. 40, 1908, pp. 210-213.

But evidently mere railing will do little good. A crust will do more to relieve hunger than will a pulpit discourse on loaves and fishes. The writer is unfortunately neither by years nor experience a commanding authority on even one detail of arctic procedure; his experiences should, however, be of value to those of less experience or of none; his opinions may also possibly have the good fortune to attract the eye of some well-informed dissenter who will feel called upon in consequence to expose a fallacy or two and thus break the embargo he has hitherto placed upon his wisdom.

In one field, too, the writer has experience exceeded by only a few scientific travelers or explorers of cold countries, for he has driven dog-sleds more than 5,000 miles through rough sea ice, across level coastal plains and among arctic mountains—three sets of conditions which comprehend the sum of possible arctic sledging experiences. Accordingly, if he is going to contribute an essay on the technique of arctic exploration, sleds and sled dogs are for him the self-chosen topic. Most men of experience are agreed, too, that this is a subject of the gravest import to one preparing a venture for the north; together with the allied topics of winter clothing and campbuilding we have in it the body of nine-tenths of the traveler's winter lore.

Nansen and his successors, both in point-blank statements and by the pride with which they point to the lightness of their equipment, make strength and lightness almost co-ordinate prime requisites in a good sled. From this point of view many men of experience differ and the writer would go so far as to make the paradoxical statement that an ounce of strength is worth a pound of lightness. Or, to put the same idea more sensibly and definitely: if a sled weighing 75 lbs. carrying a 600 lb. load will withstand a shock x , a sled weighing 150 lbs. carrying the same load would be by far the preferable sled if it could withstand a shock of $2x$ violence. In other words, doubling the strength of a sled, though you double its weight too, more than doubles its value for rough work. But it is easily possible to more than double the strength of a sled without doubling its weight, and this makes it imperative that a sled's strength shall be so proportioned to its load that danger of breakage will be minimized.

But frangibility of materials is not so important a factor in causing sled accidents as is intemperate loading. The gravest and most frequent mistakes of inexperienced sled travelers are those of burdening a sled beyond its reasonable capacity. A load of a thousand pounds, or of eight hundred, or even six, is so heavy that in going down over a hill or pressure ridge one man finds it impossible and two or three men difficult to control it. The result is that

sooner or later the sled bunts its nose or batters its side with too much force against a snag of ice, and we have a breakdown that furnishes interesting material for a forthcoming narrative but constitutes an exceedingly disagreeable experience at the time it happens. It seems to the writer that in practice a load of four hundred or five hundred pounds is as heavy a one as should ordinarily be taken into unknown ice or among mountains, while six hundred is certainly the maximum. One sled tender at each sled can keep the sled going with speed and safety not possible if the load is too heavy.

Another consideration is that the hauling weight of a sled on the level does not increase by any means a hundred pounds for every hundred of its weight. The important thing is to shoe the sleds with material that glides easily over the snow. For all-around purposes it is doubtful if any shoeing excels steel of the greatest hardness compatible with enough flexibility to avoid snapping if the sled runner should bend under a shock. Composition metal, in which copper or nickel is the essential, has much to recommend it, providing the shoeing is at least twice as thick as any the writer has ever seen on arctic sleds, say a sixth to a fourth of an inch at least. The ordinary thin composition shoeing will not go more than two hundred or three hundred miles on salt ice before wearing through and beginning to tear off. If one has Eskimo companions, ice shoeing is perhaps best of all.

Sleds, even with runners of considerable width, will now and then encounter snow so soft that they sink to the body into it. Some attempt to minimize this difficulty by having the body of the sled high from the ground or by increasing the width of the runners. But increased height makes the sled weaker as well as heavier, while increased width of runners increases the surface friction of the sled (especially on salt ice) and makes it difficult to haul. The general plan which the writer wishes to present is this: Have the sled of the height dictated by other conditions than the possibility of deep, soft snow (say eight to twelve inches) and provide for soft snow contingencies by having the bottom of the sled body made of longitudinal slabs of smooth-planed wood bent up slightly at the front end, and have these placed under (not above, as is usual) the crossbars of the sled. Then, when the runners sink into the snow far enough the body of the sled becomes a toboggan—admittedly the ideal form of sled for soft snow. With this provision for heavy going it is safe (in fact, advisable) to make the sled runners narrow if they are shod with metal, say an inch and a quarter as against the four-inch runners of the “approved arctic sleds.”

Another word as to sled shoeing: The shore whalers at Point Barrow frequently have to haul boats and other heavy loads over wet sea ice. In their experience no shoeing is so satisfactory as walrus ivory. It is soft and will not last many years on a single sled, but is both lighter-running and more durable than most of the expensive composition metal in use. Shoeing sleds in this fashion is one of the Eskimos' many contributions to the perfect equipment of polar explorers.

In discussing the question of sled construction it is to be said that writers have paid far more attention to it than they have to the more important one of sled dogs. Many books speak of the number of dogs on the ship's deck as if the number and not the individual qualifications of the dogs were the significant thing—as well rate the naval strength of China by the number of her junks or her present military power by her gross population. There is never a horse-dealer who would buy a car-load of horses, unseen, by the number of head, but explorers will place an order for so many dogs delivered at a certain time and place and then stake the success of the expedition on them. As a matter of fact, dogs differ more among themselves than do ordinary horses, almost as much as racehorses differ. Furthermore, deck room on board ship is limited as well as cargo capacity below; every useless dog needs room and eats food; every half-efficient dog eats as much as a sound dog of suitable training. Here, then, we have great waste to begin with; later on, when a sled party leaves the ship the poorer dogs are a grievous handicap, especially in the hands of unskilled drivers, who are often unable to tell whether a dog is really pulling or merely keeping his trace tight and shamming.

As to the type of dog to be preferred the following may be said: The writer has driven half a dozen Greenland dogs, and several dogs from Coronation Gulf, South Victoria Land, West Victoria Land, Bathurst Peninsula, the Mackenzie Delta, Flaxman Island, the Colville River and Point Barrow. These were all dogs secured from Eskimos. In addition he has experience with a dozen or so Indian dogs of his own from the Mackenzie River, and a few dogs of the type known in the central west of Canada as "huskies"—dogs from somewhere near Hudson Bay or from Labrador, which seem to be unrelated to the Eskimo dog proper. In general Eskimo dogs are to be objected to on three grounds: they are too small, they soon cease pulling if hungry, and they are liable to kill each other fighting. Their strong point is a furry coat that enables them to meet the cold well. Of several hundred dogs seen along the Mackenzie River not

one in four has a suitable coat; otherwise there are many good dogs among the Dogrib, Slave and Loucheux Indians. On the whole, the best dogs known to the writer are the "huskies." They have a good coat, are large enough (they weigh up to one hundred pounds), have long legs and are therefore fast walkers; they have much stamina and do not (some of them, at least) cease pulling their best till their strength is actually gone—often till they drop and have no energy to follow the sled when the harness has been removed. This last quality is not infrequent among Indian dogs, but I have never seen it among true Eskimo dogs. There is not, however, enough difference in dogs as to geographic origin to justify an expedition taking outside dogs into any district where it can rely on getting a sufficient number of native animals.

It is seldom possible to tell a good dog from a poor one by looking at him; it is not even easy to tell a poor one after you have him hitched to a sled. You see a dog going through the full pantomime of hard work: put your hand on his trace, and he is not pulling ten pounds. That sort of dog is worth no more than his skin is for clothing; he would be expensive if presented to you and a handicap if kept or used.

But how can one avoid such animals? That depends on circumstances. If you are going into a region where you can not get native dogs, and if you are not in the characteristic American fever haste which plans an expedition during holiday week and sends it off in June, if you have the time, you can go yourself or send a man who knows, to buy dogs after testing each one. If you cannot do that, get a man you can trust (if you can get such a man), in some country where dogs are used for hauling, to buy at any necessary price the dogs known in his neighborhood (be it Julianehaab or Nome) as good dogs, not too old, and well furred. (This last is important. Dogs that do well enough at Dawson or on the lower Mackenzie may freeze to death on the coast. Anyway, a dog eats more and is in less flesh if his fur is short or thin.) But if you must buy dogs by the job lot, buy twice as many as you need and have at least one good dog man to try out the whole lot at the first opportunity. Throw out the worthless and even the poor, and grade the good ones into teams, keeping the best for the severest tasks. Do not put good and poor dogs into one team; it is not fair to make a willing dog haul fodder for a laggard team-mate.

If you have good dogs (weighing, let us say, from seventy-five to ninety pounds each), four dogs are enough for a team, and six will haul a larger load than you can expect a sled to stand or one man to

take care of in rough going. Each dog should be able to handle one hundred and fifty pounds, though it is a matter of judgment in any given case whether you could not go farther and accomplish more with a smaller load.

The proper number of men on a sled trip is one man for each sled, and one besides to go ahead of the leading team to encourage the dogs on and to pick the road. It is true that every additional man cumpers the party with his food and gear, but if it be not one's object merely to spend the greatest possible number of days away from one's base of supplies, but rather to traverse the greatest distance in a given time, it will be found that, whether the distance covered during the day turns out to be two score miles or two hundred meters (but especially in the latter case), the fourth man with a three-sled party more than pays, in meters or miles, for his board and "keep."

There remains to be considered the matter of harnessing and hitching dogs to the sled. There are three general methods in use.

I. The Greenland or Eastern Eskimo method is to hitch each dog directly to the sled by an individual trace. The traces vary slightly in length, the middle dog (leader) having the longest trace. This method is open to four chief objections.

a. The dogs naturally spread in a fan formation in front of the sled; consequently only a few pull straight ahead, the others pull sideways to a greater or less extent so that (to speak a bit technically) the resultant forward tendency of the sled is at a considerable angle with the strain exerted by any of the dogs (unless it be one or two dogs in the middle of the team). In other words, a good deal of energy is wasted.

b. When the dogs come to a small cake or snag of ice they will split on it frequently, some going on one side, some on the other. This brings the sled with a bunt against the obstruction, or at least catches the traces of the dogs and makes it necessary to stop and get them on the right side of the snag.

c. When the sled stops for any reason (and sometimes even when the sled does not stop) the dogs get tangled in the traces and are often difficult to disentangle.

d. If the dogs come to a ditch-like depression or other obstruction at right angles to one's course, then all the dogs will meet the obstruction simultaneously, and the sled will probably stop. If, however, one of the other two methods mentioned below is used the rear dogs will be on good footing and hauling well, while the front dogs cross the obstruction (be it narrow, as it often is), and the front dogs

will in the meantime have secured good footing before the rear dogs get to the bad place where they cannot pull. Besides, dogs side by side are likely to crowd each other where the road is bad, and this will probably start a fight.

The two main points in favor of this system of hitching are (a) that the dogs are freer to travel fast than in any other system (an advantage only when one travels over smooth ice for comparatively short distances) and (b) that the driver can detect, by the slackness of the trace, whether any dog is shirking and can whip the animal up. Those familiar with a dog's ability at bluffing discount this argument somewhat.

2. The white man's (and Indian's) method is to hitch the dogs tandem with two traces running the whole length of the team and fastened to each dog's harness on both sides just behind the collar. This method largely obviates the difficulty of having the dogs pull in other directions than straight ahead and completely obviates the splitting of a team on both sides of an obstruction. It is true, however, that dogs so hitched will not take a light sled over smooth snow nearly as fast as will the same dogs hitched in either of the other two ways. The weightier objection is this: When dogs are pulling where there is very rough ice the leading one or two members of the team may get to an elevation in front while the sled is still on an elevation behind; the result is that the pulling of the leaders lifts the rear dogs almost or quite off their feet—occasionally one sees a dog literally dangling in the air. It is clear that any upward strain on a dog lessens his pulling power by decreasing his purchase on the ground. Furthermore, in rounding a sharp corner of ice the middle and rear members of the team are often jammed against the cake of ice so they cannot pull much, while in coming down off a pressure ridge the rear dog is liable to be injured by having the sled fall on top of him.

3. The Mackenzie River and Western Eskimo method obviates most of the difficulties of both systems and is the one which the writer thinks best suited to rough ice, though he prefers the double-trace system for overland travel. The essential of this method is that there is a single long trace from the sled to the leading dog of the team. At suitable intervals back along this trace are hitched the other dogs, the rear dog say five or six feet from the sled, and the next so far ahead of him that the nose of the dog behind does not quite come to the other's tail. There is a slight difference between the Mackenzie and the Western Eskimo method, which seems to the writer to make the Mackenzie method superior. It is this:

The Western Eskimos generally hitch the dog's harness by a toggle directly to the main trace. When this is done, a dog may be lifted off his feet in rough ice (as described above for the double-trace method). The Mackenzie people get around this difficulty by attaching the rear dogs to the main trace by an individual trace of some length, say four feet for the rear dog. The farther forward in the team you go, the shorter this individual trace. This system gives the dogs almost the freedom of the Greenland method, while in rough ice one dog may be down in a hollow and the other dogs on high places, and still the dog in the hollow has his feet on the ground and is able to pull his best. The individual secondary traces give the same facility as does the fan method for detecting laggards. True, the culprit may be too far ahead in the team for the whip; however, he can be given a place farther back nearer the sled and a more willing rear dog promoted. If properly trained, dogs hitched by this method can, and do, pull as straight ahead as they would in double traces. Only the double-trace method, to be sure, makes pulling straight ahead compulsory even for untrained dogs. As for splitting on obstructions, there is little danger of that, for dogs walking one behind the other will naturally take the same side of the obstruction as does the leader. In going around a corner of ice the dogs can all take, and do take, the side of the trace away from the ice cake and thus avoid being jammed against it.

In addition, mention may be made of an Alaska method of hitching dogs in pairs along a single central trace, each pair pulling side by side like horses. After trying and seeing this method and having seen it tried—if one knows the others—one soon sees that it has most of the disadvantages of all the other three systems and has little to recommend it. That it is used at all is probably due to the conservatism of men used to driving horses in pairs.

In spite of the fact that most of the best arctic journeys have been done with dogs hitched in the Greenland or fan style, the writer thinks it certain that better results could have been gained with the Mackenzie system. There are many explorers of great experience and achievement who have never tried but one method of driving dogs; the writer has tried the above three methods and has besides spent a year or more in each of different regions that knows only one of the three ways. He feels, therefore, entitled to dissenting courteously but definitely from those who prefer the Greenland method.

Langton Bay, Arctic Ocean, December, 1910.

CHINA IN DISTRESS

BY

LIEUT. CHARLES F. GAMMON*

We know so little of China and the Chinese, yet have grown so unconsciously familiar with the stupendous calamities which from time to time afflict that great country, that only the intermittent alarm of frequent famine stories brings to us a real sense of the horrors, the sufferings and death, in the great flood-stricken area of China; horrors not alone of mere starvation, but of that stalking, ghastly "famine fever" we call typhus and the raging small-pox which has already laid its black hand upon many of the impoverished, starving multitudes.

In a period of 1,000 years China has had over 800 famines, yet practically all of these have been unknown to the world at large. The great famine of 1878, taking its terrible toll of nine to thirteen million lives, aroused the attention and sympathy of the whole world, and the generous response which followed the appeal of a Famine Committee at that time did much to break down the barriers of anti-foreign feeling which up to then had been insurmountable.

It is difficult for us to realize the real horror of these extensive famines, confined almost wholly to China, India and Russia. Under the best conditions the Chinese live but a sordid life, devoid of many things we would regard as necessary to existence and with every form of luxury unknown,—for what the Chinese know as prosperity, we should regard as the severest hardship, as it means a coarse and meager living, a cramped and cheerless hut, and the most trying toil from the rising of the sun until the fall of darkness. Milk and butter are practically unknown, meat is rarely tasted oftener than once a week, and then only under prosperous conditions, and in the fat years, there is little surplus to be saved for the lean years of famine. Hence, when drought or flood destroy the crops, there is nothing for the hard-working farmers to fall back upon.

A large family is often divided; part go off as refugees, part stay at home. Those remaining take stock of what they have. They perhaps find sufficient grain for the five "mouths" that are left for four months if they eat but a small quantity, but the farmer

*Lieutenant Gammon has spent seventeen years in China.

knows that now the *four* months' supply must last them *seven* months, and, therefore, they immediately begin to make their food thin, that is, they eat gruel instead of dry bread. Thus tens of thousands live through the famine who otherwise must die. This gruel gets thinner and thinner and contains more and more weeds and leaves and greens, or even roots where they can be found, and less and less of grain. Every resource is used to obtain edible herbs, and everything not poisonous is put into the pot to help fill up. There is, however, little in these things to sustain life, and the bodies of the suffering family grow thinner and thinner until finally their stomachs and faces become bloated and distorted from the unhealthy elements on which they vainly strive to retain a spark of life.

In the case of a man of means, he sells first his cow, the water buffalo that plows his fields, then his farm utensils, and finally his household goods. One by one all are "eaten up," as he would say. Then the doors and windows are taken from the mud-brick hut and carried to market, and at last the few timbers that support the roof go to nourish the family. Left at last without a roof, they join the endless procession of refugees, some to drop and die where they fall, and others to struggle and stagger onward, in the hope of reaching some more prosperous region. Often they gather together into huge camps, huddled into tiny huts hardly larger than a half-barrel, cut endwise, and made of cheap matting, and in these camps pestilence soon finds its way, often in the form of relapsing fever, frequently the deadly typhus, and also in the dread small-pox which soon ends the misery of hundreds in these horrible groups.

These are the conditions existing to-day over an immense area of China. It is the result of three lean years followed by excessive rains and floods, with terrific typhoons, during all last summer, which wiped out whole towns and villages from the map and turned the roads into bogs.

Mr. Jameson, the Red Cross engineer in the field, writes of processions of gaunt, starving people wandering aimlessly, hopelessly along the roads, and falling and dying in the mud when they can go no further. Day after day he passed dead bodies of men, women and children lying where they had fallen. Famine conditions are indeed so desperate and terrible, so beyond the power of imagination to picture, that the descriptions received from different regions seem incredible. With every day these conditions become more acute and must so continue until harvest. The bark has been eaten from trees, roots have been dug and devoured, and even cannibalism is resorted to in the mad craze and unbearable gnawings of starvation.

The recent state of civil war greatly increased the distress caused by failure of crops and destruction wrought by floods, and the unsettled political conditions, still persisting, make it impossible for the new government to do much in aid of the sufferers. For this reason it becomes imperative that the United States, always China's friend, should come generously to the front with help. The remarkable patience of the Chinese under suffering makes relief comparatively easy, if only the means are supplied.

The present famine affects an area of over 50,000 square miles and a population of over 3,000,000 people. Past experience has rendered possible the distribution of famine relief on a most systematic and economical basis. The pauperizing effect resulting to some extent from relief operations in other famines, due to affording support to thousands during prolonged periods of enforced idleness, has been practically eliminated in this.

The famine fund is being largely used in employing the famine sufferers to reconstruct their own dykes and roads destroyed by the floods. Thus the idle and despairing people are enabled to earn a living while waiting for another harvest, and are at the same time helping to restore normal conditions and to prevent future occurrences of this nature. Wages are paid in food only, and this reward is necessarily so limited as to offer inducements only to those truly deserving. To save and sustain life is the object of famine relief, and since the means never equal the need, the rations must be carefully distributed, and those who are suffering least, ignored for those whose necessities are vital. These extreme cases make no demonstration—they have gotten beyond that. They do not even beg, but are mute and motionless, the spark of life hardly struggling to retain its hold upon their emaciated forms. Sometimes when they understand that the ticket given them means food and life, tears roll down their cheeks. Tickets for food are given only in the home, except in exchange for labor, the necessities of each family being judged, not by the home, but by the faces of its inmates. A man may be hungry and suffering for food, but unless his face is swollen from anemia he must be passed by for those more terribly needy. Were it not that through centuries of poverty and extreme hardship only the strong have survived, half the 3,000,000 now suffering would have died in the first months of the famine.

So prompt and systematic were the plans formed by the committee in Shanghai that nearly all of the 3,000,000 starving ones might be saved, if but the tender impulse of charity were to touch the hearts of a sufficient number of people in this prosperous land. Each day

the cable, with lightning-like rapidity, conveys the dollars sent to the Committee in New York direct to the Committee in Shanghai. Thousands of the helpless ones are by this means given work to do and food to sustain them, and, with the experience gained in famines of the past, the loss of money in administration and all unnecessary expenses are eliminated. Certainly nothing can more appeal to the human heart than the knowledge of starvation, and as the extent of this great famine is becoming better known, so the response becomes more general.

The New York China Famine Relief Committee, composed of representative men, is co-operating with the Red Cross and all money received is promptly cabled to the Committee in Shanghai, without deduction. Thus far, through this channel and others, over \$175,000 has been sent, a sum which is accomplishing great good but one totally inadequate to meet the terrible need.

The Relief Committee appeals to all, even those who can afford to give but little, reminding them that every little will help swell the fund. One dollar will save the life of a man, woman or child for a month; three dollars will preserve a whole family for a similar period, and there are 600,000 families starving, with no possibility of relief until the summer harvest. Time is an important factor in this crisis; in a few weeks help will be of no avail. The sooner work and food are provided, the easier it will be to restore normal conditions and to stay the epidemic of disease which accompanies starvation.

Remittances may be sent to Mr. Jacob H. Schiff, Treasurer, 1 Madison Avenue, New York.

NUBIA AND THE BERBERINE

Under this title Mr. H. W. Beckett delivered a lecture before the Cairo Scientific Society, last year, which was printed in *The Cairo Scientific Journal* (Vol. 5, No. 59, 1911). He gives much information about that region known to-day as Nubia, a long tract which from the First Cataract at Aswan to Dongola borders the Nile with a fringe of fertile growth. This strip of cultivation varies in breadth from a few meters just south of Aswan, where the granite precludes any but the most meager attempts at tillage, up to two or more kilometers at places further south. In these places the Berberine indus-

triously till the soil that stretches as a level plain westward to the hills which look out over the arid desert.

The word "Nubia" as a name for the country south of the First Cataract is not known to the present inhabitants and is preserved only by modern geographers. It is possible that the name was derived from the word "Nuba," by which appellation the ancestors of the present inhabitants were known.

From very early times the people of Nubia had close relations with ancient Egypt. As early as the first dynasty, or about 4400 B. C., the power of Egypt was predominant up to the First Cataract, and slowly its domination was extended until, in the sixth dynasty, Pepi I had such control over the tribes of northern Nubia that they were compelled to supply troops for his armies. Mr. Beckett devotes much space to a review of the history of Nubia and its relations with Egypt.

The people call themselves Barabra, and there is still much speculation as to their origin. Some authorities, like Lepsius, maintain that they are a negro race but mingled with an Hamitic strain. Sergi, on the other hand, holds that they cannot be a mixed race and asserts that they preserve the true primitive Nubian type, and are of Hamitic origin. They call their language Nuba, and besides the parent language there are four dialects of it spoken between the First and Fourth Cataracts.

They are of medium size and well proportioned, shorter than the Egyptians, and have black, wavy hair, never woolly. Most of the men, some time or other, visit Egypt and enter domestic service there or go even further afield. They are great travelers, quickly acquire a foreign language and often take on a veneer of civilization. It is a curious fact that the women are as conservative in their habits as the men are the reverse. The women are rarely met outside their native country and cling with tenacity to their old customs. Most of the men know Arabic, but few of the women understand more than a few Arabic words. In their limited Arabic vocabulary the word "backsheesh" holds an honored place, though Mr. Beckett says he was seldom pestered for backsheesh except at places where tourist steamers touch.

Agriculture is the principal occupation of the people, and the way of life of the people is simple, like that of the Egyptian fellahin. Every foot of available soil near a village is cultivated and one pities the people when he considers that though they will be able to carry on their cultivation in future, yet during a large part of the year the reservoir above the Aswan Dam will be full up to the level of 113

meters above the sea, so that all their land will be completely submerged. Egypt's gain will be Nubia's loss. Many of the villages will have to be removed to higher ground at a greater distance from the present stream. The Government has promised to pay the people for every building or palm tree submerged, and Mr. Beckett found individuals busily engaged in erecting houses in the direct path of the future inundation with the fond idea of recouping themselves at government expense, with good interest on the outlay.

Burckhardt, who traveled in Nubia early in the 19th century, made the remarkable statement that the size and figure of the people were usually proportionate to the extent of the cultivable soil. "Where the plain is large and the people can cultivate to an appreciable extent, and are in comparatively favorable circumstances, they are tall, muscular and healthy; but where, on the contrary, the plain does not amount to more than twenty or thirty meters in extent they have small figures" (!).

As most of the younger men are in service in Egypt and only return to their villages at intervals, it is generally the older men and the women and children who live in the villages and tend the crops. A large amount of money is sent back to Nubia as the result of the money-earning abilities of the men who go to Egypt for work. It is said that as much as \$200,000 a year finds its way up the Nile from Egypt to the villages lying between Aswan and Dakka, so that domestic service in Egypt has its compensations for the people who remain at home.

Their manufactures are few, and consist chiefly in the production of handmade pottery, mats and baskets made from the leaves of the date palm, and coarse woolen and cotton cloth woven on a rough loom, which the women use to make their garments, though most of the men buy their clothing in Egypt. Their villages consist of mud-built houses, erected generally on the desert side of the cultivated land, their distance from the river varying with the breadth of the cultivated area. Often the houses, clustered close together, are perched on the rocks or high ground overlooking the fields and the river. Some houses have outside staircases leading up to the roof. The mosques are the most pretentious buildings.

The interior of the houses is beautifully clean and neat and is thus in marked contrast to the dwellings of the Egyptian fellahin and the poorer classes in Egyptian towns, which are almost invariably filthy. The floor covered with clean sand, the household pots and pans hanging from the ceiling shining and polished, and the absence of refuse and of the unpleasant smells which proclaim the proximity of an

Egyptian village all testify to the love of cleanliness of these people, who in their own homes, whatever they may be in Cairo, are a scrupulously clean race.

"As with all Mohammedan peoples, so with the Barabra, hospitality is a very common virtue and even becomes at times somewhat embarrassing. Tea appears to be greatly prized as a luxury among them and is pressed upon the guest, very often served, sad to relate, in cups ornamented with the name of some hotel, accompanied by spoons the crests or initials on which point to their having been brought away from Egypt as souvenirs of service."

It would be hard to picture a more healthful race, for disease is rare among them, except ophthalmia, which is fairly prevalent, though not so widely as in Egypt, and rheumatoid arthritis, which is almost universal. This disease is probably due to the constant immersion of the limbs in water, such as one would naturally expect from people engaged all their lives in agricultural pursuits necessitating the constant use of water for irrigation. The women seemed to be incessantly carrying their water pots to and from the river.

The scenery of Nubia has a charm peculiarly its own. Narrow though the strip is, it makes a belt of green between the desert and the river . . . There are here and there spots of real beauty. Occasionally the scenery is rugged and steep rocks rise almost clear from the water's edge; but ordinarily the banks are low and covered with castor-oil plant, lubia, and sunt trees, while the dom and date palms are scattered here and there, and in the background are clusters of mud houses that mark the sites of villages. At Dakka, where the houses are close to the water's edge, the view of the town from the river is extremely picturesque. This is one of the prettiest spots along this part of the Nile.

ISOSTASY AND MOUNTAIN RANGES*

BY

HARRY FIELDING REID

The cause of the elevation of mountains has always been a most fascinating subject of study, and we find the earlier geologists giving much attention to it. In the first half of the nineteenth century the prevailing idea was that mountain ranges were due to the upward pressure of liquid lava and that their elevation was closely related to the volcanic forces. As late as the middle

* The BULLETIN is permitted, through the courtesy of the American Philosophical Society of Philadelphia, to reprint this paper from its *Proceedings*. The paper was read before the Society on April 21, 1911, and appeared in the *Proceedings* in Vol. 50, 1911, pp. 444-452.

of the century Elie de Beaumont upheld this idea with all the prestige of his great authority.

But a more detailed study of the structure of the rocks which make up the mountains led to different conceptions. It was found that the whole mass had been subjected to tremendous compressional forces in a line at right angles to the mountain range. This was shown by the immense folding of the rocks, the existence of thrust faults and of cleavage and the evident flattening out of fossils; so that the existence of these tangential forces was thoroughly proven. This led then to the idea that mountains owe their origin not to vertical forces, but to the great tangential forces which folded the rock and squeezed it upwards. Professors Heim and Suess in Europe, and Dana, Hall and Le Conte in America, were all very active in developing this point of view, though Dana realized that vertical forces also played some part in the elevation of mountains; but the dominant influence of the tangential forces was recognized in the name *orogenic*, or *mountain-making* forces, which was reserved entirely for them. Without doubt, confidence in the efficiency of tangential forces was greatly strengthened by the fact that these forces could be satisfactorily accounted for by the cooling of the earth; for the cooling is greatest at a short distance below the surface and the exterior layers are subjected to tangential crushing to accommodate themselves to the shrinking interior.

There are great areas of the earth, such as the high plateau regions in the west of the United States, where the rock has been elevated many thousands of feet but without suffering any compression whatever, which makes it quite evident that there are vertical forces which produce many movements in the earth's crust. Mr. Gilbert has given to these forces the name of *epeirogenic*, or *continent-making* forces, to distinguish them from orogenic forces; but we must not forget that epeirogenic forces are apparently alone active in the elevation of certain mountain ranges. The Sierra Nevada, for instance, although its strata are much folded, owes its present elevation to the vertical forces which seem still to be tilting the great block. Mt. St. Elias also seems to have been tilted up by vertical forces without any folding of its strata.

The American geologists showed that a mountain range does not rise haphazard in any part of the earth, but that it appears where there was earlier a great geosynclinal, which had gradually subsided and accumulated sediments to an extraordinary thickness, all of them being laid down in comparatively shallow waters; and it was only after this preparatory step that the foldings and elevation of the mountain range took place.

But there is one important factor to which geologists have not given proper attention, that is the revelations of the plumb-line. About the middle of the nineteenth century Archdeacon Pratt pointed out that in the south of India the plumb-line was deflected toward the Indian Ocean, and in the north of India, although it was deflected somewhat toward the Himalaya mountains, still the

gravitational attraction of these mountains was considerably less than it should have been, if the density of the material in and under them had been the same as in other parts of the earth's crust; and he, therefore, suggested that the oceans were deep because the material under them was heavy, and the mountains were high because the material which composed them was light, and that in general the amount of material under any two equal segments of the earth was the same. But these facts did not make a great impression upon geologists and did not prevent the further advocacy of compression and the consequent accumulation of material as the cause of mountain elevation.

In 1880 Mr. Faye showed that the so-called "anomalies" of gravity would practically disappear if, in reducing observations on land to sea-level, no account were taken of the land mass above sea-level; and if, in reducing observations made on islands in mid ocean, the excess of attraction of the island mass over an equal amount of sea-water were subtracted. This is equivalent to assuming that the continental areas stand up on account of their low densities, but that the small islands are supported by the rigidity of the crust.*

In 1889 Major Dutton read a very remarkable paper before the Philosophical Society of Washington,† in which he pointed out that the mountain regions were probably continuing to rise as a result of the lightening of their weight by erosional transportation and that regions of deposition near the coasts were probably sinking on account of the added material which they were receiving, and that the forces thus brought into play would set up slow currents from the regions under the sea towards the region under the mountains; and he held that the earth was not strong enough to sustain the weight of great mountain ranges but that these owed their elevation to the fact, as already suggested by Archdeacon Pratt, that they were lighter than the material under the lowlands, or under the oceans; and that there was, therefore, a certain equality of weight in the various segments of the earth. He gave to this theory the name of *isostasy*, which has served to give it definiteness ever since. It is to be noticed that Major Dutton considered the elevation of mountains to be due to vertical, and not to tangential forces.

The theory of isostasy has been much discussed by geologists since Major Dutton's paper; many papers have been written on the subject, and the available geological evidence has been invoked in support of, or against, the idea; but it was not until very recently that the real evidence which lies in the variations of the force of gravity and the deviation of the vertical, has led to definite conclusions.

Mr. Putnam and Mr. Gilbert‡ discussed a series of gravity observations

* "Sur la reduction des observations du pendule au niveau de la mer," *C. R. de l'Acad. des Sciences*, 1880, Vol. 90, pp. 1443-1447.

† "Some of the Greater Problems of Physical Geology," *Bull. Philos. Soc. of Washington*, 1889, Vol. XI, pp. 51-64.

‡ "Results of a Trans-Continental Series of Gravity Measures," *Bull. Philos. Soc. of Washington*, 1895, Vol. XIII, pp. 31-76.

made across the United States, which led them to the conclusion that isostasy was true only in so far as the very largest features of the earth's crust, such as the continents and ocean basins, were concerned, but that mountain ranges were at least in part supported by the rigidity of the crust.

When Dr. Nansen drifted across the North Polar basin in the *Fram* he provided pendulums to determine the force of gravity when the ship was frozen in ice; and the discussion of his observations showed that gravity was normal over that basin, or, at least, where his observations were made.*

Professor Helmert,† in Germany, has done much in the discussion of gravity measures and Dr. Hecker has made some notable voyages and has determined the forces of gravity at sea, over the Atlantic, Indian and Pacific oceans, and over the Black Sea, the results showing that on the whole the force of gravity is normal over these bodies; only in special and limited areas, in the neighborhood of very steep slopes, was any marked anomaly found.‡

But the most important work which has been done along this line is the work of Dr. John F. Hayford,§ who, while connected with the United States Coast and Geodetic Survey, discussed in a thorough and able manner the deflections of the vertical at a large number of stations in different parts of the United States, and his results show definitely that over this region isostatic equilibrium actually exists. He has concluded that this is true even for areas as small as a square degree, that is, seventy miles on the side. He believed that the earth is not strong enough to sustain an added thickness of more than about two hundred and fifty feet of rock over an area as large as a square degree without slowly yielding. The stations where the observations were made are scattered over various parts of this country, on the eastern coast, in the Appalachian mountain range, in the region of the Great Lakes, near the Gulf of Mexico, in the great plains of the Mississippi basin, on the great elevations of the Rocky Mountains, the plateaux of Utah, the Sierra Nevada mountains and the Pacific coast, regions exhibiting a great variety of topographic forms and differing greatly as to geologic activity. Whatever movements may be going on in the Rocky Mountains, and in the region between them and the Atlantic Ocean, are certainly very small; whereas to the west, and particularly in the State of California, the movements seem to be very active. The eastern edge

* "The Norwegian North Polar Expedition of 1893-96," Vol. II, Part VIII, Results of the Pendulum Observations, by O. E. Schiötz.

† "Höhere Geodesie," Leipzig, 1880.

‡ "Bestimmung der Schwerkraft auf dem Atlantischen Ozean," *Veröff. des Königl. Preuss. Geodet. Instit.*, Neue Folge, No. 11. "Bestimmung der Schwerkraft auf dem Indischen und Großen Ozean," *Veröff. des Zentral-Bureaus der Internat. Erdmessung*, Neue Folge, No. 18. "Bestimmung der Schwerkraft auf dem Schwarzen Meere," same, No. 20.

§ "The Geodetic Evidence of Isostasy, etc.," *Proc. Washington Acad. Sci.*, 1906, Vol. VIII, pp. 25-40. "The Earth a Failing Structure," *Bull. Philos. Soc.*, Washington, 1907, Vol. XV, pp. 57-74. "The Figure of the Earth and Isostasy," United States Coast and Geodetic Survey, 1909. "Supplementary Investigation in 1909 on the Figure of the Earth and Isostasy," same, 1910. "The Relation of Isostasy to Geodesy, Geophysics and Geology," *Science*, February 10, 1911.

of the Sierra Nevada received additional elevation at the time of the Owens Valley earthquake in 1872, and the comparatively frequent earthquakes in the Sierras and the Coast ranges make it quite possible that these mountains are now being elevated as actively as at any time in their history. In view of the great variety of the country in which the stations were located, both as to topography and geologic activity, in view of the great amount of material being continually eroded from one region and deposited in another, thus tending to overthrow the isostatic equilibrium, and in view of observations in other parts of the world, we are driven, with Dr. Hayford, to the conclusion that isostasy is not an accidental condition existing at the present time within this country, but is due to the fact that the earth yields plastically to the long-continued action of even small forces. We feel justified, therefore, in believing that isostatic equilibrium exists in other parts of the world and existed in other geologic ages, and in saying that the whole earth is, and always has been, in isostatic equilibrium.

This conclusion carries with it many important consequences and has a very direct bearing on the theories of the origin of mountain ranges; for it tells us that every segment of the earth, having an equal area of surface and with its apex at the center, contains the same amount of material, which it is impossible either to increase or decrease. If by erosional transportation a large quantity of material is removed from a high land and deposited in the oceans, then the increase of weight under the ocean and the decrease under the mountains will, as Major Dutton explained, set up a subterranean counter flow, which will restore the equality of material in the segments. If by the exercise of tangential forces a portion of the earth's crust is compressed and folded and the quantity of material in the segment thus increased, the added weight will cause a slow sinking of the region and material will flow out from below and reduce the mass of the segment to its proper value. Indeed, the folding up of the rock by tangential pressure would not elevate a mountain range, but would cause the folded region to sink; not, however, necessarily below its former level.

When we consider the origin of the mountain ranges, the theory of isostasy requires that all hypotheses, which call for more than the normal amount of material in any segment, be excluded. The folding of rock under tangential forces, and the increase of material by subterranean flow are necessarily debarred. Dana noticed that the great mountain ranges of the world were opposite the great oceans and, in some cases, were opposite the great depths of the oceans. The inference was natural that material was taken from the ocean bed, increasing its depth, and added to the land, increasing its height; but the theory of isostasy forbids this inference. He also suggested that the segments of the earth forming the oceans were sinking more rapidly, as the earth cooled, than the segments forming the continents, and also that they were stronger; so that they compressed the continents, folding the rock and making mountain

ranges around their borders. Besides other objections to this idea, the theory of isostasy excludes it on account of the increased material required in the land segment. Professor Charles Davison* has suggested that the oceans owe their existence to the stretching and consequent thinning of the strata below them, but the theory of isostasy does not permit the withdrawal of material from the ocean bottoms. Sir George Darwin† has suggested that the continental areas of the earth may be due to elevations caused by the differential retarding effect of lunar tidal action. But the theory of isostasy tells us that they could not have maintained themselves unless they were especially light; and in this case they would have existed independently of the tidal forces. Although these elevations, or "wrinkles," as Sir George Darwin calls them, might have been distorted by the different tidal effects in different latitudes, their original meridional direction still requires explanation.

The foldings and contortions of the rock have been so intimately associated, in the minds of geologists, with mountain ranges, that a low-lying region of folded rock has been looked upon as the remains of a mountain range removed by erosion; but as mountains are not due to rock folding, this inference may be entirely wrong.

Only a few of the consequences of the theory of isostasy have been mentioned; but the principle is of such fundamental importance that it will surely exercise a strong influence over our future theories, and will be applicable in directions not now suspected. Unfortunately, it does not tell us definitely what is the cause of the elevation of mountains and plateaux; but it limits our inquiries by excluding all theories which assume the addition of matter to a segment. It tells us, quite definitely, that the elevation of mountains, or the depression of the oceans, must be due to vertical forces brought about by a decrease or increase, in the density of the material under these regions. According to it, the mountains are high because their material is light; and as geological history tells us that the mountains have not always existed, we must conclude that they were elevated by an expansion of the material in and under them. And the great depths of the oceans are deep because the material under them is dense and they have become deep by an increase in the density of this material. Since all mountain areas are being lowered by active erosion and many of the great ocean depths are being filled by depositions, the great heights of the former must be due to the fact that they are still in the process of elevation or that they have only recently been raised; and the great depths of the latter to the fact that they are in the act of sinking, or have only recently sunk. As the centres of the great majority of strong earthquakes are along

* "On the Distribution of Strain in the Earth's Crust resulting from Secular Cooling, with special reference to the Growth of Continents and the Formation of Mountain Chains," *Phil. Trans. R. S.*, 1887, Vol. 178 (A), pp. 231-242.

† "Problems connected with the Tides of a Viscous Spheroid," *Phil. Trans. R. S.*, 1879, Vol. 170, p. 589.

the boundaries of high mountain ranges, or of great ocean deeps, it seems most probable that the forces which have produced these very interesting features of the earth's surface are still in active operation.

FARMERS OF FORTY CENTURIES*

A REVIEW

In occidental lands the population grows denser by the growth of villages, towns and cities. Exception has to be made of new, frontier regions, like the Canadian Northwest, where there is a good deal of growth by the taking up of new lands. But new lands are becoming scarce in the world, and manufacturing industry, which is town or village business, has so developed in the last century that in the United States nearly half the people are now living in centers of over 2,500 inhabitants. If all centers be counted, less than 2,500 as well as more, much more than half of us would be found living in them. In Europe the proportion may be still larger. The greater the population density, the more pronounced this preponderance of city life. In our South, 15 to 30 per cent. of the people live in centers of 2,500 or more people, in the southern Great Lake country 50 per cent., and in New England over 75.

Thus is it that in occidental lands population densities of over 250 to the square mile attest manufacturing as a main occupation of the people, and this mainly in cities of considerable size. Europe has some 200,000 square miles of this density, including the ninety largest of its 150 cities of over 100,000 people. This belt of very dense population stretches from the English Midlands to Poland, and is the seat of the continent's greatest manufacturing activity. In China with a population not so much less than Europe's, there is three times as much territory with 250 people to the square mile, yet it contains but twenty-five cities of more than 100,000 people. In the Orient a very dense population is not incompatible with country life, for agriculture is still the preponderant occupation, but it is an agriculture of an intensity unknown with us.

Of this intensity of Oriental farming, and the great density of their population, Professor King knew nothing in 1905. He was interested merely in the long continuity of their farming processes; he had great respect for the knowledge which so-called ignorant farmers in this country had acquired by experience long before it was explained by scientists, and desired to learn what the far longer experience of the East had taught the farmers there, especially in matters of soil management, on which he had long been at work. Thus he was in a receptive mood, but he was "surprised and amazed."

The crowding of the people is intense, hence the motive of high cultivation. An acre of good land (p. 193) is ample to maintain six persons in China and three in the southernmost islands of Japan; that means 3,840 and 1,920 people to

* *Farmers of Forty Centuries or Permanent Agriculture in China, Korea and Japan.* By F. H. King. ix and 441 pp. Maps, ills., index. Mrs. F. H. King, Madison, Wis. 1911. \$2.50. 8x6.

the mile, but it makes no allowance for mountain and waste lands, which in Japan make up five-sixths of the territory. The cities, however, have still to be counted in. In their neighborhood the densities will be above the figures given. Extensive areas within the cities of Chicago and New York are less densely settled. In favorable regions in Shantung the country dwellers average 1,536 to the square mile (p. 233). On the largest plain of Japan, that of Tokyo, measuring 2,700 square miles, the average is 2,645 people to the mile (p. 419). King found the overcrowding in Japan visible to the eye (p. 23), the cities with houses, the houses with people or wares, the country with fields and the fields with crops. It is this dense population, through the long period of their occupation of their land, that has taught them that painstaking practice of agriculture which attracted the western scientists.

Their overcrowding has been recently described as condemning the whole people to misery and wretchedness. There is no mention of this view in Professor King's book, but he did not see things so. He found them contented and happy. In Japan strong men and contented, with their faces often wreathed in smiles (p. 19). At Moji, Japan, his steamer was coaled by long lines of men and women with baskets. Aboard the vessel a woman empties them, while her two-year-old baby sways in the sling on her back (p. 42). "The mother looked strong, was apparently accepting her lot as a matter of course, and often, with a smile, turned her face to the child who patted it and played with her ears and hair."

In China, everywhere, the laboring people who were occupied were contented. Idlers or vagrants hardly existed away from the places where tourists encourage them. There can be no doubt that the laboring classes perform a vastly greater aggregate of steady individual toil than with us. Old men and women continue their labors at an age when we should want them spared. Yet all these people exemplify a thrift unknown among us. Servants sent to make a purchase get some equivalent if the price of the article sought is a trifle high and decline to use an American stove as it wastes so much fuel, making too big a fire.

The Chinese at Shanghai were large men, quite equal in frame to large Americans but quite without superfluous flesh, yet few were underfed. Beside the crowding of the people, they have to contend with a heavy burden of taxes. In China it is not unknown for these to be levied a second and even a third time in the same year (p. 331). In Japan the taxes in 1907 amounted to \$2.60 per capita, nearly \$9 per acre of cultivated land, and \$23 for each household in the empire.

The yields secured from the soil are large and by a careful succession of crops the ground is kept at work all the time. A light sandy loam in Manchuria yielded, in a year, first twelve bushels of wheat to the acre, then twenty-one bushels of millet, and later twenty-five bushels of soy beans, all measured to the acre and on the same ground. A gardener near Nagasaki grows three crops of rice, puts \$60 worth of fertilizer on it and gets a return of \$250 per acre. Another Japanese farmer is represented as getting a hundred dollars' worth of crop from less than a tenth of an acre of ground. They crowd their plants as they are crowded. The very hens in Japan number over 800 to the square mile of cultivated land (p. 180), more than twice as numerous as with us.

"The important point regarding these Far East people to which attention should be directed, is that effective thinking, clear and strong, prevails among the farmers who have fed and are still feeding the dense population from the

products of their limited areas" (p. 207). The sympathy and admiration of that paragraph are typical of Professor King's book. It was the farming classes he sought to meet. He could not talk to them. Interpreters were often not to be had, but he made himself known, guiding their plows, watching their processes and exchanging smiles with quickly made friends.

In ever present hot water for making tea—characteristically kept in fireless cookers—he is sure he sees (p. 77) a preventive measure against typhoid fever, almost inevitable in lands of so dense a population. Apparently, the careful analysis of waters in Manchuria by Japanese medical scouts was not purely an adoption of Western science but in part a refinement of instinctive Oriental practices. As "fundamental sanitary practice" he notes the rarity of flies and attributes it to the scrupulous saving of household wastes (pp. 78, 202).

Chinese mechanical appliances are of a high order of efficiency and simplicity. As an instance might be mentioned their foot-driven irrigation pumps, similar to our chain pumps, but with large wooden blades where they have widened members of a chain, working in an open inclined trough instead of a tube. Their merit consists not merely in their ability to lift seven and a half acre feet of water in ten hours for forty-five cents, gold, but also in their simple construction and easy application to field, ditch and ever-ready man-power. Shall we introduce modern power appliances into China? Apparently they have something more efficient. Where can steam compete with stern-wheel boats driven by rows of men treading around an axis, if this apparatus can carry passengers at a fifteenth of a cent a mile? If efficiency and adaptation are criteria, King saw Western machinery outmatched at every turn. Near Sungkiang he saw a railroad bridge built on the ground in a field (p. 299). When it was completed water was turned under it and compelled to make itself a new channel and the old one was filled in. The Japanese simplified their water-lifting apparatus into a mere wheel in the ditch. A man trod the paddles on the water side, making those on the land side lift water to the field (p. 302). On a Chinese river the current did the lifting.

Of road building the Chinese have done little apart from the imperial courier routes. They have taken the more direct course of developing the vehicle. Their wheelbarrow is represented as the most efficient vehicle imaginable for good roads or bad, with a broad tire on a large wheel in the midst of the load, not, as with us, at one end of it. The carrier takes what little strain rests on the handles on a broad shoulder strap and carries four, six or eight passengers at once or an equivalent load of merchandise. An animal may be harnessed or a sail spread to help. Where we have sought the worker's ease while he worked as an end they have set their vision purely on getting the maximum result from the minimum of outlay. Human effort is merely one of the forces they employ. They assume it will continue to be exerted. At Nanking a Chinaman is seen bricquetting charcoal powder moistened with syrup waste, adding tiny pinches to a mold and giving repeated blows with a heavy hammer. The principle used is the same utilized here in the most modern hay and cotton presses of repeated small charges (p. 139), giving a much denser bale than is otherwise possible. Always the mechanism is reduced to the lowest possible terms "the principle put to work almost unclothed" (p. 363). So their vertical turbines and horizontal axis wind-mills for pumping salt water about Tientsin (p. 335). Highly scientific incubation of hens' eggs and those of ducks and geese is carried on in China in wicker covered jars containing 1,200 eggs each and the charcoal heater. A

single room visited in Shanghai (?) contained thirty of these incubators. Sterile eggs are quickly detected and put on sale before they have spoiled as food. At the incubators, eggs are bought at six cents for thirteen; seven of the chicks, when ready to feed, for nine cents, almost every family in city or country village buying and keeping a few. The building scaffoldings of lashed poles, allowing adjustment to any height and indefinite reuse are of course familiar in Europe and a result of scarce lumber.

King gives the Chinese nitre-farmer credit for a good understanding of nitrification and suggests that our forbears, who left us such a phrase as "mother of nitre" did not do it without a perception of a vital factor active here even if they had never seen bacteria with a microscope. It is interesting to see a scientist of King's standing so prompt to recognize the science embodied in Oriental farm practice. But he went East prepared to do this. Watching a Chinaman fit soil with a hoe for half an hour, he notes that angle worms abound and admires to see the hoe neither harm a single worm nor leave one uncovered (p. 205). "While we could not talk with him, we were convinced that his action was continually guarded against injury to the worms." He felt that the man acted as if he knew the value of the worms as well as he. He found their farm implements not crude but admirably adapted to their circumstances. Even our plows would be impossible there. Coal shipped in open cars was sprinkled with whitewash, making theft self-revealing; other bulk commodities similarly. The Chinese Wall was not only completely efficient in its day, but its \$520,000,000 of cost very small in comparison with the national defenses of European nations. The steep ridging of the fields makes rain penetrate quickly, letting the air out above that the water may enter below. The effective use of human excreta and garbage in fertilizing, the thoroughness with which it is composted and applied to the soil to balance the heavy drain of the close succession of crops is made very clear in every detail. Great cities in China and Japan need no hydraulic sewerage system. Canton, on the contrary, receives yearly \$31,000 in gold from a contractor for the privilege of removing all house waste. At Kobe, Japan, such waste is sold for from 54 cents to \$1.63 per ton. Japan applied a ton and three quarters to each acre of her fields in 1908. The chemical contents involved are everywhere worked out in detail. Europe and America are estimated to throw into the sea annually the equivalent of over a million tons of phosphate rock.

With us in the West, as has been said, increased population means more of city life and the conditions of city life do not seem satisfactory, for it is there that misery and crime most abound. That this life is attractive to the country dweller is evident from his widespread movement toward the town, perceptible too in the Orient, but in a very much less degree. But there is no note in King's work of such misery in the dense agricultural populations of the East. In studying the future possibilities of population in this country we have been told that we do not propose to consider Chinese conditions. Our progress cityward is evidence of a desire to escape from burdens. In this the mass of the city dwellers have failed utterly. The Chinaman and the Japanese have shown us that heavy burdens may be borne with contentment.

On the whole, it is a remarkable glimpse of the East that we have here. These are real observations of a real observer. They convince the reader of their truth and accuracy. The effect of the fairly wonderful photographs is to strengthen this conviction, though they are often poor as photographs and poorly reproduced. Their contribution to the argument is very great. We have been so

often told that the Chinese mind is sealed to us that it is refreshing to find a most modern and highly trained American without any inkling of their language or civilization at once at home among them on his own ground.

MARK JEFFERSON.

GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

A regular meeting of the Society was held on April 23, 1912, at 8.30 P. M., at the Engineering Societies' Building, No. 29 West 39th Street. Councillor Levi Holbrook in the Chair. The following persons recommended by the Council were elected to Fellowship:

George A. Armour,	Frank R. Cordley,
C. G. Seymour Bagot,	Ralph Adams Cram,
Thomas H. Barber,	Henry Edward Crampton,
Joshua William Beede,	Thomas DeWitt Cuyler,
Ernest C. Bliss,	H. Stuart Hotchkiss,
Charles Wilson Brown,	Marion Eppley,
Rudolph E. Brünnow,	Mrs. E. L. Reaney,
George Bryce,	Mrs. Edwards Spencer,
C. L. Carpenter,	Otto M. Eidlitz,
Thomas H. Chamberlin,	Hans A. Frasch,
Frederick G. Clapp,	Jacob Hasslacher,
Jane Perry Cook,	W. Thorn Kissel.

The Chairman then introduced Mr. W. S. C. Russell of Springfield, Mass., who addressed the Society on "Iceland." Lantern views were shown.

THE SOCIETY'S HOUSE TO BE CLOSED IN JULY. The Council decided, at its meeting on April 18, to close the Society's building during the month of July. The house will be reopened on Aug. 1.

AMUNDSEN TO RECEIVE THE DALY MEDAL. The Council on April 18 awarded the Charles P. Daly Medal to Captain Roald Amundsen. The medal bears the following inscription:

"Awarded to Roald Amundsen in recognition of the value of his magnetic observations in the American Arctic, achievement of the Northwest Passage, explorations in the Antarctic, and attainment of the South Pole."

The medal will be presented to the explorer at one of the meetings of the Society during his coming visit to this country.

NORTH AMERICA

FAILED TO SCALE MT. MCKINLEY. The expedition to Mt. McKinley which left Fairbanks, Alaska, on Feb. 5, fitted out by a newspaper of that town to make the ascent of Mt. McKinley, returned unsuccessful on April 10. The party says that it attained an elevation of 10,000 feet on the north side of the mountain east of Peter Glacier. Precipitous ice cliffs prevented further progress. These are apparently the same ice cliffs which defeated F. A. Cook's

attempt to ascend the mountain on that side. The party did not have sufficient supplies to attempt the ascent by another route.

NEW MAP OF ROCHESTER. In 1911, the area included in the U. S. Topographic sheet embracing Rochester, N. Y., was resurveyed and the new sheet has just been issued. The resurvey consisted in revising the culture—railroads, wagon roads, houses, etc. Rochester has made growth since the original survey in 1893 and the new sheet shows that the surrounding country is much more thickly settled.

QUATERNARY DEPOSITS IN COLORADO. The glacial and river deposits in the Breckinridge district near the Continental Divide in Summit County, Colorado, are estimated to have yielded approximately \$10,000,000 in placer gold since first operated in 1860. F. L. Ransome has recently described these Quarternary deposits ("Geology and Ore Deposits of the Breckinridge District, Colorado," *Prof. Paper, U. S. Geol. Surv.*, No. 75, 1911, pp. 72-80, 175-181, 183). The glacial deposits are terminal moraines, valley train outwash, lake deposits, hillside wash, and terrace gravels; and there are strips of modern stream alluvium, residual soils, and talus accumulations. Ransome concludes that the terrace gravels and older hillside wash represent an earlier cycle of glaciation which was followed by retreat and by readvance in a later glacial cycle, whose deposits are the moraines and low-level gravels or outwash. There is no morainic material of the first advance, which is thought to have taken place because some of the moraines and valley train gravels occupy valleys cut in the terrace gravels and because the terrace gravels themselves are considerably weathered.

L. M.

GLACIERS EAST OF MT. WRANGELL, ALASKA. In connection with the study of the mineral resources of Alaska it is often possible to gather important data on glaciers and glaciation. Many publications of this sort are issued under the direction of A. H. Brooks, and the matter is illustrated once more by a recent U. S. Geological Survey publication, containing a discussion by Moffit and Capps and an excellent map by Witherspoon (Geology and Mineral Resources of the Nizina District, Alaska, *Bull.* 448, U. S. Geol. Survey, 1911, pp. 43-52).

The former extent of glaciation is presented in some detail and shown upon the geological map. An interesting feature is the importation of foreign rocks and pebbles of native copper into valleys containing none of these rocks in place, at the stage when the ice rose 3,000 or 3,500 feet higher than now and overrode high cols. The intensity of glacial erosion at the maximum is shown by steepened valley walls, truncation of spurs, hanging valleys, etc., well described in the text and shown upon the topographic map. The great thickness of outwash gravels, 500-700 feet in places, bears an interesting relationship to glacial stream alluviation and apparently to the barring of mouths of deglaciated tributary valleys by the trunk glaciers. These and many other specific points in connection with the present glaciers and the former glaciation mark the report as one which should be of great use to glacial geologists.

It seems gratuitous to criticise, in a case where the geologist in charge of a division of mineral resources encourages, and the authors undertake so much work outside their special field,—the stratigraphy and the copper and gold deposits. Nevertheless, one cannot help regretting the rigidity of a system of map legends which makes it necessary to map the glacial outwash as "alluvium (gravels, sand, and silts of floodplains)," sharply differentiating it from the outwash in the beach gravels, which is included in "moraines and associa-

ted gravels (glacial till and glacio-fluvial bench gravels, sands, and silts).” The geological map, and the cross sections upon it, are open to criticism in this respect, for they set up an artificial, arbitrary boundary, suggesting a sharp change in conditions of deposition, where there has doubtless been a continuous process. Indeed, the map gives no hint that the “alluvium” is of glacial origin, though the text makes the relation of these deposits to the existing glaciers perfectly clear. A minor error is the mapping of the present terminal moraine of Kennicott Glacier, which is made up largely of till, and rises sharply above the glacial floodplain as “alluvium.” The suggestion of interglacial epochs, though accompanied by a frank statement that there is no evidence of them, seems unnecessary.

It is to be hoped that future work on economic geology in regions of existing glaciers may result in other reports on glacial geology as praiseworthy as this one. In addition to the report itself, an especially good feature is D. C. Wither- spoon’s topographic map on the scale of an inch to the mile and with 50-foot contours, including the innovation, at least in United States Geological Survey maps, of blue contours upon the glacier surface. These afford important data upon the slopes of the ice margin and its surface. The contours would be of great value, for example, in the case of Kennicott Glacier, if an advance should break up the slow-moving southern portion, now covered deeply with ablation moraine, for they would enable the accurate measurement of the thickening of the glacier-with advance. Or if advance were postponed many years, a resurvey would make it possible to determine accurately the rate of thinning of a moraine-veneered glacier by ablation. It is to be hoped that the contouring of Alaskan glaciers may be continued where possible, and that geologists like Moffit and Capps may be encouraged to continue the observation and publication of glacial data, as in this excellent report. LAWRENCE MARTIN.

THE TANCÍTARO PEAK. Ezequiel Ordoñez, former Assistant Director of the Geological Institute of Mexico, visited, in January, 1910, the Tancitaro Peak, one of the highest mountains in the southwestern part of the Mexican Central Plateau. He published a paper on the mountain in *Memorias y Revista de la Sociedad Científica “Antonio Alzate”* (Sept.-Oct., 1910), from which the following facts are condensed.

The Tancitaro Peak is one of the highest (12,660 feet) in the western part of the Mexican Central Plateau. It lies in the southwestern portion of the district of Uruapan, in the state of Michoacán in $19^{\circ} 5' N.$ Lat., $2^{\circ} 59' 57'' W.$ of Mexico City, according to Lejarza.

The mountain can be distinguished from afar owing to its isolation. It rises above the gentle southern slope of the Mesa Central, and is topographically connected with the outlying volcanic ranges by a line of vents of no small importance. The peak is a highly eroded ancient volcano, at the foot of which a malpais region extends in all directions. The district immediately surrounding its base has been overrun by successive lava flows emitted by near-by volcanoes. The crest of the mountain has a general N-S trend. Its southern extremity is visible at a distance owing to its height, the peak rising to 3,860 meters above sea level according to hypsometric calculations. Its northern extremity, slightly less than a kilometer in length, is subdivided into two main branches which, together, assume the form of a horseshoe. It is here that the Vibora cañon originates to end subsequently in the tierra caliente west of Apatzingán. The westernmost of these two branches is the more important

and is known to the natives of the district by the names of Piedra del Horno, Piedras Paradas, etc. In the same way other spurs radiate outward from the peak towards the south and, to a lesser degree, to the east and the west. They thus present the appearance of the spokes of a huge wheel.

The most abrupt slopes of the Tancitaro face the south and west, where the mountain rises precipitously to a height of 1,800 meters. The geologist says that he was struck with the fact that, in Michiocán, the Sierra Madre del Sur appears to be independent of the northern orographic system that characterizes Mexico.

SOUTH AMERICA

SHEEP IN PATAGONIA. In recent years sheep growing in Patagonia has become so important that the wool of this region is already beginning to have an influence on prices in the world market. During the last third of the 19th century sheep were introduced into Patagonia from the Falkland Islands and wool raising was undertaken in Tierra del Fuego and other regions near the Strait of Magellan and also at various places on the east coast. The industry spread to the north and flourished best on the dryer plains of the Patagonian steppes. In 1910, 11,251,346 sheep were grazing in the large territories of Neuquen, Rio Negro, Chubut, Santa Cruz, and Tierra del Fuego. It is expected that the number of sheep will surpass 12,000,000 during the present year. As agriculture becomes more intense in Argentina and is extending into the sheep grazing lands, the industry is pushing southward into Patagonia.

A SOCIETY TO STUDY THE FOLK LORE OF CHILE. At a meeting of the Sociedad Científica "Antonio Alzate" held on July 4, 1910, City of Mexico, Professor Engerrand gave an account of the formation of a Chilean Society for the study of the country's folklore. The society was organized at the suggestion of Sr. Rodolfo Lenz, a German-Chilean and author of several works on the Chilean Indians and their languages. He has advised that the researches should be subdivided under the following headings:

I. Literature: (a) Poetry; (b) Prose.

II. Music, Dancing, Sculpture and Ornamental Arts.

III. Customs and Beliefs: (a) Holidays and Amusements; (b) Customs and Beliefs having reference to human life; (c) The material side of human life in general; (d) Social occupations and workers.

IV. Ordinary Language: (a) Theory of language; (b) The components of language.

Sr. Lenz calls attention to the importance of the study of the gradual alterations of words as a key to the history of civilization. He shows how Chilean words are in process of alteration at the present time and cites such examples as: *ruvulucion*, *turumoto*, etc., which are used instead of *revolucion*, *terremoto*, etc. (*Mem. y Rev. Soc. Cient. A.A.* Vol. 29, Nos 7-12. Jan. to June, 1910, City of Mexico.)

RUBBER ALONG THE UPPER ORINOCO. The rubber industry of southern Venezuela is pretty closely confined to the immediate flood plains of the tributaries, and the chief rubber producing section is along the Casiquiare. From the mouth of the Casiquiare to the Rio Negro, rubber trees are more plentiful than elsewhere in the Orinoco basin, and the population is larger than on many of the tributaries. The production in a single year on the Casiquiare and its tributary the Siapa amounts to 300,000 pounds. One of the principal towns

in the rubber country is Fernandez de Atabopo at the junction of the Atabopo and Orinoco rivers. It is here that the rubber pickers collect at the end of the season to ship their product to Ciudad Bolivar. In the last few years the rubber crop of this district has reached as high as 400,000 pounds. (*Daily Consular and Trade Reports*, April 5, 1912, No. 81, p. 70.) The extraction of rubber generally starts in September and lasts until March or April, each Indian workman having 300 or 400 trees to tap. Since steamboat navigation on the Orinoco stops at the rapids of Atmes, the principal part of the product must be transported down the river by canoes to a few trading centers.

I. B.

EFFECTS OF DIMINISHED RAINFALL IN VENEZUELA. In spite of its periodically heavy rains and widely inundated flood plains, central Venezuela now and then has an unusually dry season. The winter rains of the past season have been light, and, as a consequence, forage on the llanos has been scant, the vegetable crop has diminished, the crop of cacao was seriously damaged, and the Orinoco was so low as to interrupt regular navigation. One steamer was damaged by running aground; others now end their voyage at Caño Colorado near the mouth of the northern distributary of the Orinoco. From this point the cargo is transhipped to light-draft river boats which take it to Ciudad Bolivar, the regular terminal port of the larger steamers under normal conditions. (*C. and T. Rep't.*, No. 99, April 26, 1912.)

I. B.

AFRICA

THE SURVEY OF EGYPT. Captain Henry G. Lyons, late Director of the Survey Department of Egypt, prepared a summary for *Nature* (Vol. 89, 1912, No. 2214, p. 126) of the Report of the Survey Department, which has recently appeared, on the work done in 1910. The geodetic triangulation was carried southward, reconnaissance having reached Tema, about 450 kilometers south of Cairo, while angular measurements and latitude observations were completed as far as Etsa, about half way. Precise leveling in the delta is nearly complete, and is being pushed on towards Assuan up the Nile Valley, Assiut having been reached, and a branch line carried into the Fayum. The gravity survey of the Nile Valley was begun, and observations were being made at a series of stations between Cairo and Khartum. The magnetic survey of the Nile Valley up to Wadi Halfa was finished, and in 1911 its extension into the Sudan was to be undertaken. Topographical surveying added considerably to the material which will be used for the publication of maps of the Nile Valley and Delta in 1:50,000 and 1:10,000. The survey of Alexandria on the scale of 1:1,000 was completed, and that of Cairo was advanced. In geology the Department's labors were mainly directed to the Red Sea coast and especially that part of it near the petroleum region at the south end of the Gulf of Suez. A considerable number of cadastral and topographic maps will soon be added to the large number already published. These additional sheets will be welcomed; and the progress of this scientifically controlled survey in Northeastern Africa is watched with much interest outside of Egypt.

MORTALITY IN THE BELGIAN CONGO. An official report of the Belgian Congo shows that the death rate in that region among the white population has greatly decreased in recent years. This gratifying fact is due to increased knowledge of tropical hygiene, better medical service, and the multiplication of the com-

forts and conveniences of life. From 1900 to 1904 inclusive the average annual death rate per 100 white inhabitants was 6.79; in 1905, 5.69; 1906, 4.25; 1907, 4.38; 1908, 4.69; 1909, 2.62. The largest mortality occurred along the Lower Congo, and in the Equatorial District and the Bangala and Mobangi regions. The Province Orientale had the smallest death rate, in 1909, for example, 1.91. On the other hand, the death rate at Matadi in that year was 4.08. (Statistics from *Le Mouv. Géogr.* No. 13, 1912.)

WIRELESS TELEGRAPHY IN THE BELGIAN CONGO. According to the *London Times* (Weekly Edition No. 1840), the installation of wireless telegraphy recently established in the Belgian Congo is giving complete satisfaction. It is expected that Elizabethville, in the southern part of Katanga Province, will within a few months be in communication with Stanleyville, about 1,000 miles to the north. The post of Lisala is now communicating with Boma, Brazzaville, Kindu and Stanleyville, four of the more important settlements along 1,185 miles of the Congo.

FRUIT EXPORTS FROM THE UNION OF SOUTH AFRICA. In January this year (*Agric. Journ. of the Union of South Africa*, Vol. 3, 1912, No. 3, p. 431), the value of the fresh fruit exported from the Union was valued at \$54,060. The chief exports in order of value were pears, peaches and plums. South African fruit develops in our winter season, reaches the London and New York markets early in March and is becoming a considerable item in the exports from that region. Some years were required to perfect methods of packing and shipboard storage so that this perishable commodity would cross the tropical belt without deterioration, but little loss is now incurred, and fine fruits reach the northern markets, command high prices and are sold before the fruit trees of England and the United States begin to blossom.

ASIA

THE PILGRIMAGE TO MECCA. According to *Nature*, the annual pilgrimage to Mecca has greatly increased since the building of the Damascus-Mecca Railroad. In the year 1880, about 92,000 pilgrims made their way to Mecca. This was about the average annual number of pilgrims. In 1904, when a part of the railroad was in operation, the number of pilgrims increased to about 200,000, and three years later, in 1907, 281,000 of the Faithful made the pilgrimage. These figures are taken from Turkish official statistics. Of the pilgrims about 113,000 were subjects of Turkey, 40,000 came from British India, 17,000 from North Africa, 16,000 from Russia, 15,000 from Persia, 13,000 from the Sudan and 12,000 from Central Asia.

EUROPE

EARTHQUAKES IN ITALY. Notices of the earthquakes recorded in Italy during the first ten and a half months of 1908, are given in the last four numbers of the *Bollettino* of the Italian Seismological Society. The catalogue briefly describes over 500 local shocks, and 94 distinct earthquakes. It is significant that local shocks frequently occurred at Messina, Reggio, and other places that were ruined towards the close of the year, showing the gradual preparation for the great impending earthquake. Full details are given of the eruption at Etna in 1908, which was accompanied by a remarkable series of earthquakes.

PERSONAL

Henryk Arctowski, of New York City, will endeavor, this summer, to write out the results of his latest scientific studies relating to: (1) The yield of corn in the United States; (2) Changes of temperature in the equatorial regions; (3) Annual variation of atmospheric pressure in the United States; (4) Climatic changes in Northern Europe during 1900-1909, a work for which he has collected a large amount of meteorological data.

Prof. A. P. Brigham expects to spend the early part of the summer at home, and to accompany the Trans-continental excursion in August.

Oliver L. Fassig, Section Director of the U. S. Weather Bureau at San Juan, Porto Rico, will spend the coming summer completing a report on "The Climate of Porto Rico." He has given the past three years to a study of the island, and to the reduction of observations made at about fifty climatological stations under the auspices of the U. S. Weather Bureau from 1899 to 1911. The report will probably be published by the Chief of the Weather Bureau at an early date.

OBITUARY

REAR-ADMIRAL GEORGE W. MELVILLE. Rear-Admiral Melville, Engineering Chief of the U. S. Navy, is dead. He was born in New York City in 1841. In 1879, as a member of the Jeannette Expedition commanded by Lieut. George W. De Long, he went to the Arctic, showed great efficiency during the long drift in the ice and the tragical experiences of that ill-fated party, and commanded the survivors who succeeded in escaping from the Lena Delta and returned to the United States. Later, he returned to the Lena River and recovered the records of the expedition and the bodies of Lieut. De Long and his companions. A gold medal was struck for him by special act of Congress, and several institutions honored him with degrees in recognition of his labors in behalf of science.

GENERAL

A BUST OF REAR-ADMIRAL PEARY. The clay model for a bust of Rear-Admiral Peary, executed by Mr. William Couper, is now on its way to Florence to be cut in Carrara marble. Mrs. Morris K. Jesup presents the bust to the American Museum of Natural History, and it will take its place among the other marble busts in Memorial Hall.

THE TENTH INTERNATIONAL GEOGRAPHICAL CONGRESS. The Organizing Committee, with the concurrence of the Permanent Committee in Geneva, has decided that the Congress shall be held in the week beginning March 27, 1913. The programme of the excursions after the Congress will be changed in consequence of holding the session in March instead of October as previously arranged.

ANOTHER MEDAL TO DR. CHARCOT. The Paris Geographical Society will present its gold medal to Dr. Charcot for the geographical results he achieved in the Antarctic by the *Pourquoi Pas?* Expedition.

MEDALS OF THE ROYAL GEOGRAPHICAL SOCIETY. The Founder's Medal has this year been awarded to Mr. Charles Montague Doughty for his explorations in Arabia, and the Patron's Medal to Mr. Douglas Carruthers, for his work in Turkestan and Arabia. The Victoria Medal, which is specially awarded for scientific research in geography, has been conferred upon Sir George H. Darwin.

GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

(The size of books is given in inches to the nearest half inch.)

NORTH AMERICA

California under Spain and Mexico. 1535-1847. A Contribution Toward the History of the Pacific Coast of the United States, Based on Original Sources (Chiefly Manuscript) in the Spanish and Mexican Archives and Other Repositories. By Irving Berdine Richman. xvi and 541 pp. Maps,* charts, plans, appendix, index. Houghton Mifflin Co., Boston. 1911. \$4. 9 x 6.

Though primarily a history of early California, this book contains an important amount of geographical data. One cannot help wishing that the geographical facts were more consciously used and that much more emphasis were placed on the geographic relations of historic movements. The earth appears to be merely land with places on it. Certainly the region exhibits better than most others the fact that conquest is interactive; that when man "conquers" Nature he at least bears the marks of a struggle. It would have been a wonderful tale, had Mr. Richman chosen to tell it from that standpoint, and reduced somewhat the rather tedious narratives of unimportant (*i. e.*, not really history-making) events. It is a very painstaking piece of work, remarkably well done in places, but not always well balanced.

Reading between the lines, one comes upon relations of much geographic interest. Southern California and northwestern Mexico, lying in the belt of horse latitudes, have a climate which, combined with remoteness from the rest of New Spain, long delayed the exploration of the region by land. Settlements were made and long maintained with extreme difficulty. The late development of the region is striking. Los Angeles was founded five years after the beginning of the American Revolution. Traffic by sea at least passed the Californian coast early in the 16th century, in spite of fogs and uncharted shores, chiefly because of the Spanish galleon trade with the Philippines. Slowly the head of the Gulf of California was discovered and mapped, trails were extended across the inhospitable Colorado desert, and outposts were established. Their fate often hung in the balance. The idea of conquest and religion ran hand in hand, with gold apparently a minor motive. A chain of missions finally led through the Coast Ranges from lower (extreme southern) to upper (San Francisco to Los Angeles) California.

The Indians long lived undisturbed in the great Central Valley, and, mobile and at least semi-nomadic, plundered the mission Fathers and their neophytes, a condition suggesting a second parallel line of missions farther east. The thin population of the country down to the early decades of the 19th century is astonishing. Horses and cattle were so numerous as at times to be shot merely to

*Listed under "Historical," *Bull.*, Vol. 43, 1911, p. 799.

reduce their numbers; meanwhile the people were in dire want of even the most necessary garments. Trade was stagnant, at first for reasons of geographic position, later because of government interdictions. At last came the Russians from Alaska with otter skins, imploring food, and after them the American ships asking otter skins, hides, tallow, and bringing merchandise; thus a three-cornered trade sprang up, clandestinely on the part of the Californians, but not the less vigorous and important. Americans began to stream in over the California and Oregon trail, the Santa Fé trail, and by sea, and began effective encroachments. A great deal of so-called Spanish occupation was mere pretension; the inherited pretensions of Mexico in the Southwest, once disclosed, were exploded; war with Mexico brought an inevitable result. In 1849 the people adopted an American constitution and the old life rapidly declined. ISAIAH BOWMAN.

Wheat-Growing in Canada, the United States and the Argentine.

Including Comparisons with Other Areas. By W. P. Rutter. x and 315 pp. Maps, charts, bibliography, index. Adam and Charles Black, London. 1911. 3s. 6d. 8 x 5½.

This book contains a thorough study of the problem of wheat growing, not only as an agricultural feature, but also in its bearing on the commerce of the world. A bird's-eye view of the distribution of wheat fields in North and South America is first given. The soil, climate and various essentials of scientific farming, affecting the yield and quality of wheat, are clearly set forth. Following are chapters on the cultivation and harvesting of wheat, yield and cost of production, transportation, storage, marketing and price. The discussion of the transportation problem, which is often weak in many books, is especially commendable. The author believes that the United States is destined to depend more and more upon other countries for its supply. An adequate bibliography of wheat is included.

R. M. BROWN.

The New Garden of Canada. By Pack-Horse and Canoe through Undeveloped New British Columbia. By F. A. Talbot. xii and 308 pp. Ills., map,* index. Cassell & Co., Ltd., London. 1911. \$2.50. 8 x 5½.

A description of Mr. Talbot's journey through 1,200 miles of almost unknown country in which the Grand Trunk Pacific is now building its line, the second transcontinental railroad route of Canada. Mr. Talbot tells of his eventful journey, and gives his conclusions as to the economic and scenic value of that newly opening region. He has condensed these impressions in his paper published in the *Bulletin* for March (pp. 167-183).

Aus Mexiko. Von Orla Holm. Mit wirtschaftlichen und politischen Beiträgen von Ralph Zörn. viii and 244 p. F. Fontane & Co, Berlin. 1908. Mk. 3.50. 9 x 6.

The book is written for the use of the tourist rather than the scholar, not as a regular guide-book, however, but as an instructor about everything which the educated traveler ought to know of the country he is visiting: geography, history, religion, population, natural products, commerce and industry, finances, traffic, art, social conditions, immigration, foreign relations (especially to Germany and America). As the author is German himself, special credit must be given him for the unprejudiced frankness with which he acknowledges what

* Listed under "British Columbia-Alberta" on p. 399.

American influence has done to improve Mexican conditions. He often holds up the enterprising American as an example for his more cautious countrymen, not with any intention to depreciate the good which they have done, but prompted by the desire to make them see their opportunities as Americans do theirs.

A book like this can naturally not be called scientific, but there is no doubt that it will satisfactorily fulfill the purpose for which it was written.

M. K. GENTHE.

Les États-Unis du Mexique. Par Cte. Maurice de Périgny. xi and 310 pp. Map.* E. Guilmoto, Paris. 1911. 5 fr. 50. 9 x 5½.

This work is a compilation of general information on Mexico. The writer's countrymen who may visit our sister republic will find much of interest in its pages. Many of the data are of a statistical nature. Some appear to have been culled from Mexican newspapers. The author hardly ever refers to his sources of information. His descriptions of native customs are accurate and make pleasant reading matter. Indeed they constitute the most agreeable feature of the book.

A short historical sketch and a review of social and industrial conditions fill the first few chapters. An attempt is then made to subdivide geographically the text of the last ten chapters. The intent is laudable, but the units used are not well differentiated. This is rather remarkable, as there are few regions whose physiographical or other types available for geographical description are more sharply defined than in Mexico. For example, the writer fails to grasp the significance of the eastern and western orogenic movements that gave rise to the high central plateau which is very abruptly cut off from the two coastal regions bathed respectively by the Gulf of Mexico and the Pacific Ocean. And yet he has set foot in both of the units thus created. His chapters contain excellent pen pictures of the various manifestations of life found in each. He notes the difference between the mountaineer peon and the inhabitants of the lowlands. The striking change in the vegetation as one travels up from the "tierra caliente" must needs have struck the attention of so observant a traveler as he reveals himself to be in other respects. The very alteration of the soil and of the rocks themselves, with the minerals they include, is exceedingly marked, so sudden is the transition from one type to the other. Had the author adhered entirely to such a classification as a major scheme and extended it subsequently for the sake of thoroughness, so as to comprise the southern region of high uplift along an E-W axis, and then made use of his climatological data as a minor subdivision, his readers would have had the subject before them in adequate geographical presentation. He is entitled to credit, however, for his endeavor to handle his work in this form. But the order in which his headings follow each other tends to bring out the fact that his pages have been taken bodily out of his note book and in the same sequence in which they were jotted down as he proceeded on his journey.

Mr. de Périgny naturally gives considerable space to mining, Mexico's foremost industry. His data on the production of some of the famous mines are interesting. Furthermore they are correct and free from the inaccuracies born of enthusiasm. But when he attempts to give geological information or to enter into technical details, the layman's ignorance becomes apparent. His description of the Dos Estrellas mines at El Oro is a case in point. He also calls attention to

* Listed under "Mexico" on p. 399.

the progress accomplished in agriculture as well as to various growing industries of the Republic. In this connection his statements regarding the commercial and industrial activities of "les Nord-Américains" are decidedly unfair. He has not escaped falling into the error common to many Europeans who visit Mexico. No doubt, had he stayed longer in the country his opinion would have radically changed. He would have realized that most of Mexico's progress is due to contact with the people north of them; also that the material prosperity and comfort of a rising Mexican bourgeoisie has followed in the wake of American enterprise. His friendship towards his hospitable hosts has evidently prevented him from giving expression to the apprehension felt by every well wisher of Mexico in her present plight. Recent events, however, have brought to light certain phases of Mexican deficiency to which the writer has abstained from alluding. It is unfortunate that the book must be read with due provision in mind for this omission. The fact is that the writer has succeeded in giving an account of the country in the state of progress to which Diaz's ability brought it. As such his book will always be valuable.

LEON DOMINIAN.

Panama. The Canal, The Country, and The People. By Albert Edwards. x and 585 pp. Maps, ill., index. The Macmillan Co., New York. 1911. \$2.50. 8 x 5½.

Our people have had Panama served to them in small and large doses for a number of years, and they may be so surfeited that a book with the above title may not appeal strongly to them. Although there is no new material in many chapters, yet the book is written with such freshness of treatment, and impressions are so vividly conveyed, that it is a worthy contribution to the already large library on Panama.

In a few chapters the author describes the two terminal cities of the Canal, the people, the republic, and gives a little of the geography of the Isthmus. Twenty chapters follow on the history of Panama, much of it bearing more or less directly on the growth of the republic, beginning with the discoveries of Columbus and ending with current topics. The book ends with a few chapters on the subsidiary problems of the canal, such as the management of the Canal Zone, the sanitation of the area, the life of the transplanted Americans, and the leaders of the undertaking. Altogether the book covers a large number of subjects relating to Panama, and it seems to have been carefully compiled.

R. M. BROWN.

SOUTH AMERICA

Brazil, its Natural Riches and Industries. (Foreign Edition.) Vol. I: Preface—Productive Industry. 384 pp. Maps,* ill. Vol. II: Agriculture, Communications, Manufacturing. 418 pp. Ills. Comissão d'Expansão Económica do Brazil. Aillaud, Alves & Co., Paris. 1910. 11 x 7½.

An official two-volume publication (foreign edition in English) issued by the Brazilian Government to supply information relating to all the industries carried on in the country.

A third of Vol. I is devoted to brief summaries of Brazilian history, geography and geology, growth of population by immigration, and advantages for commerce. The productive (extractive?) industries discussed are: (1) those

* Listed under "Brazil" in *Bull.*, Vol. 43, 1911, p. 876, and under "Historical" in Vol. 44, April, 1912, p. 320.

having to do with natural vegetation, especially forest products; (2) products from wild animals; and (3) the mineral industries. Under productive plant industries rubber is the chief. A very good and comprehensive survey is made of the development of that industry, together with its industrial and commercial effects on Brazil. Much space is also devoted to the possibilities of trade in woods, of which the country has an infinite variety.

The products of fishing and of the chase have so far attained but little importance in Brazil, despite the many species of animals which might contribute to such activities. The most interesting topic of this section is the account of the Brazilian whaling industry from Bahia.

Aside from the section on rubber, the great value of Vol. I lies in the survey of mineral resources and mining industries. Each of the two score kinds of mineral wealth comes in for some mention, but gold, iron, manganese, diamonds and coal stand out most prominently. The discussion of iron, however, gives but an inadequate idea of the magnitude of the rich deposits of Minas Geraes, which are just now being the object of much careful examination. The report makes it very evident that the fuel problem in Brazil is almost the leading one in point of interest. Rather optimistic statements are made concerning the possibilities of the coals from Santa Catharina and Rio Grande do Sul, but analyses of samples, from various places, do not confirm this optimism.

The report serves excellently to present the vast latent possibilities of Brazil, and shows, in most cases by statistical tables, what progress has been made in the various lines of production up to 1907. The second volume is better as indicating material progress in Brazil.

WALTER S. TOWER.

El Uruguay á través de un Siglo (L'Uruguay à travers un Siècle). La jornada civilizadora realizada en la República Oriental del Uruguay y el brillante porvenir de esta nación Americana. Obra escrita por Carlos M. Maeso. 533 pp. Maps, ill. Tip. y Lit. Moderna, Montevideo. 1910. 15 x 11.

At first glance one asks: Why such a gigantic book about such a small country? A casual examination explains the unwieldy size; the book is printed in parallel columns of Spanish and French, and with a great profusion of illustrations (some very beautiful), statistical tables, charts and diagrams.

The object of the book is to show the progress made by the country during the first century (really only eighty years) of independent national existence. This is attempted by emphasizing especially what Uruguay is at present. All phases of activity, even to the Jockey Club, come in for their share of the discussion. Some of the more important sections deal with: the "land of Uruguay"; the city of Montevideo; commercial relations; agricultural and pastoral industries; transportation facilities, both by rail and by water; water and mineral resources; the Liebig Company; and the representative industrial and commercial establishments.

The discussion of "the land" is quite devoid of any statement of climatic influences which may affect it, and is generally descriptive rather than analytical. It is hardly as good as similar discussions to be found elsewhere, but it helps in some ways to support the claims that Uruguay is "a beautiful country," with "enchanted panoramas," "a rich soil," etc. Much the same criticism may be directed against the description of Montevideo. All who know that place are quite agreed that it is "one of the most beautiful cities of America," but statistics of building operations and passenger traffic on tramways, descriptions of streets

and avenues, and catalogues of institutions scarcely prove the contention quoted above. What Montevideo is and what it stands for, after four generations of Uruguayan independence, is but poorly indicated in this part of the text. An examination of the illustrations in the volume will tell much more, in that way.

The sections dealing with commerce, and with agricultural and pastoral industries, deal with the real sinews of Uruguayan strength. These sections contain much valuable information, and, better than any other part of the monograph, they give an idea of Uruguayan progress during the last fifty years especially. Few statistical comparisons cover the whole period of independence. It is shown how Uruguay has made rapid commercial progress, with a five-fold increase since 1862, and how gratifying it is to Uruguayans to see the exports increasing somewhat more rapidly than imports, to see that their country exceeds in commercial importance some much larger American nations, and in per capita value of commerce compares very favorably with any. Staple exports like wheat, flaxseed, wool and jerked beef have special consideration, as also groups of wares and trade relations with leading countries. One is not surprised to find here a rather elaborate indictment of the United States merchant, owing to his failure to adapt himself to business methods in Uruguay.

The section on agricultural and pastoral resources can scarcely fail to convince everyone of the great possibilities of the country. Soil analyses from different sections indicate the "rich soil" so often mentioned, while the fact that less than 37 per cent. of the area was under cultivation (in 1906) proves that cropping has barely begun. The policy of encouraging railroad building is recognized as the best means of further development along this line. In fact, a brief but suggestive discussion of the "transformation of Uruguay" tells very concisely the ways in which governmental and private activities, with respect to transportation facilities, agricultural colonization, and development of resources in general, are making a new Uruguay.

For facts of every kind, except geologic and physiographic, this book is a mine of authoritative information. Its statistical tables, charts and diagrams are perhaps the most valuable single feature.

WALTER S. TOWER.

AFRICA

A Travers la Chaouia avec le Corps de Débarquement de Casablanca (1907-1908). Par le Capitaine Grasset. 231 pp. Maps,* ill. Hachette et Cie., Paris. 1911. Fr. 5.50. 7½ x 5.

This is a soldier's blunt tale in more than one respect. But the soldier shows himself a keen observer, as well as a man imbued with scientific tastes. His narrative is a record of the French military occupation of Moroccan territory from the summer of 1907 to that of 1908. A brief review of the events leading to French intervention is given first. The Moroccan question is treated with impartiality. No attempt is made to consider the subject from its broader standpoint as affecting international politics. The details of the military operations are presented in diary form. They throw light on the preliminary methods of colonization often forced upon European nations engaged in furthering the cause of civilization on the Dark Continent. It is especially those who have followed the growth of the vast colonial empire the French are building south of the Mediterranean who will be able to learn much from Captain Grasset's book. His

* Listed under "Morocco" on p. 399.

account is all the more interesting, as he appears to have been able to understand the somewhat unintelligible psychology of the natives and their consequent attitude towards foreigners.

Best of all, the author has embodied some valuable geographic data on the Chaouïa, in the form of an appendix. This territory was but imperfectly known before the advent of French officers. It lies between 34° and $32\frac{1}{2}^{\circ}$ N. Lat., and extends some 175 kilometers west of longitude $6\frac{1}{2}^{\circ}$ W. Its inhabitants have all the traits of the fanaticism peculiar to their race. This was primarily the reason why the country remained practically unexplored until about five years ago. In the short interval since then its orographic and hydrographic features have been investigated. Its broader geologic relations have been ascertained. The influence of these factors on the commercial and industrial data furnished by the author may be inferred from his descriptions. To the student these short scientific sketches form perhaps the most interesting portion of the book. Some excellent photographs also help to give a fair idea of the country.

LEON DOMINIAN.

Gold Coast Palaver. Life on the Gold Coast. By Louis P. Bowler. 173 pp.

Portrait. John Long, Ltd., London. 1911. $7\frac{1}{2} \times 5$.

A most unpretentious little book is this, its jacket of an appropriate yellow: just the things seen by a miner who has driven pick into the auriferous reefs of many lands and now on the Gulf of Guinea has found things which struck him as new and strange and likely to interest those whose lives have a shorter tether. Criticism is disarmed at the outset, for the man does not know the first rules of construction. After setting down a caption, if his story does not run to so much as a page, that is a chapter good enough for him. Lindley Murray might have a word to say to him, in fact a great many words, for he does as suits him best with the rules of grammar. Yet the reader is going to prove very cordial to this small narrative. It is such an intimate record of the little known land which lies back of the beach scarcely better known. Every experience here recorded shows itself genuine; no one can doubt its accuracy. There is a charm in the record of the unusual, particularly when it happens to some one else who chances to survive to tell the tale. There is a particularly happy incident of a houseboy who cautioned the author that the cook had "put medicine" into the soup, and when invited to taste his own pottage the cook shrieked "massa, dem soup kill man one time!" Here we have a sample of the jargon of West Africa, the Kroo-boy, a fecund *lingua franca* which will be found worthy of study by philologists. The sum of such examples amounts to a little more than a thousand words, but they have been found worth extracting for later study. It is upon such simple records as this that we must depend for the most valuable material. A dozen disconnected pages will yield rich treasure to the student of folk lore, particularly valuable as bearing upon Uncle Remus of our South and the Annaky of the West Indies. WILLIAM CHURCHILL.

Congo Life and Folklore. Part I: Life on the Congo as Described by a Brass Rod. Part II: Thirty-Three Native Stories as Told Round the Evening Fires. By the Rev. John H. Weeks. xxii and 468 pp. Ills., index. The Religious Tract Society, London. 1911. 5s. $8\frac{1}{2} \times 5\frac{1}{2}$.

For the general reader the method of this book is singularly inept. Yet it is the general reader who is going, as soon as the treasure is pointed out to him, to forget the fault of method and to enjoy a really brilliant record of life

on the lower Congo. The author, probably because he could thus best feel sure of publication, has chosen to write a volume intended to find a place in Sabbath School libraries in one of the straitest sects of English dissent; not only that, he has reverted to an absurd old fashion of having the story told by a mere rod of brass, the common medium of exchange value in the African jungle. Yet despite this forbidding fiction of construction the book is vivid, fairly crisp with life. Except for this absurd conversational bit of base metal the people stand out clear and distinct in the life which is theirs and show us what they are and how they live. The value of the book is ethnographic. Here, as throughout equatorial Africa, the keynote of interest for American students is Brer Rabbit. In these tales of the Congo—thankfully we note a hundred pages of them—the characters are the gazelle and the leopard. We find the tar baby in what must be its true beginning: the leopard sticks by virtue of the magic of unholy "juju" in the fetish image, a higher plane of thought than mere adhesion to sticky tar. Even in the Basubwa legend of Nakami the baby is coated with glue. In the country of Miss Cronise's "Cunnie Rabbit, Mr. Spider and the other Beef," in Sierra Leone, where we find a contamination of the Annacy mythos, it is to a wax girl that Mr. Spider sticks fast. If Mr. Weeks has done naught else for us he has given us the tar baby in its true and spiritual essence, the fetish image Nkondj.

WILLIAM CHURCHILL.

Dr. Walter Volz. Reise durch das Hinterland von Liberia im Winter 1906-1907. Nach seinen Tagebüchern bearbeitet von Dr. Rudolf Zeller. 167 pp. Ills., maps. A. Francke, Bern. 1911. Mk. 3.60. 9½ x 6½.

The back country of Liberia has remained practically a *terra incognita* to this day. Most of the stimuli which promoted exploration elsewhere were lacking there. Prospective colonists preferred countries better suited for cultivation than its almost impenetrable woods, and its fauna and flora seemed too little diversified to make it especially attractive to scientists. In addition, the lack of personal safety throughout the territory acted as a general deterrent. For, without the protection of a strong mother country, the Liberian government was hardly able to maintain its foothold on the coast, and the hinterland was for a long time an apple of discord between the neighboring powers. It was not until 1908 that Liberia made good its claim on it, by taking formal possession of its native settlements, just in time to prevent its annexation by France. It is owing to this state of things that the information which this book contains was dearly bought by the untimely death of its author. It is based on the contents of his diary and note books, which were worked over by a friend and reproduced as much as possible in the author's own language.

Dr. Volz entered his field of work from Sherbro, Sierra Leone, crossing the western boundary of Liberia beyond Baiiama, and thus stepping directly into the back country without touching the Liberian coast. The first country which he traversed in Liberia was that of the Bande tribe, a region of moderate hills, with more or less swampy bottoms between, and where the villages were built on the hills. They had a more or less regular, circular shape, and were protected by live hedges, four or more in succession, instead of palisades, which were planted across the roads, and had one opening in the center for a door. Proceeding eastward towards Sambatahun, the country was found less densely wooded and less hilly. Tobacco and rice were cultivated in the bottoms. Deserted villages were plenty, testifying the belligerent mood of the Bele tribe

farther to the south. The inhabited settlements were all fortified; the most important of them is Loma, where the author reached his most southerly point. There the houses, oval or rectangular in shape, were built on foundations considerably broader than the walls, so that they protruded from under them, forming a kind of step or bench all around the house. Only half of the area covered by the roof was enclosed by the walls; the other half formed an open piazza, covered by the roof and supported by four beams or poles. Slavery is still practiced there, in spite of the laws of the country.

At that place Dr. Volz received the first news of impending war, but resolved to proceed. Being detained at Loma for about three weeks, he used the enforced leisure to compose a comparative vocabulary of the five dialects spoken in the neighborhood, and collected information on the dreaded Bele, which affirmed earlier reports of their cannibalism. He finally reached Bussamai, the capital of the Siama, whence he sent a letter to the commander of the French detachment beyond the line, but waited in vain for an answer, and his letter probably never left the town. He then desired to go on to the French post, but carriers and guides were openly refused by the natives, who seem to have held the white man as a kind of fetish. So he was obliged to stay there in semi-captivity, and was killed in the attack on Bussamai by the French.

M. K. GENTHE.

ASIA

The Coming China. By Joseph King Goodrich. xx and 298 pp. Ills., index. A. C. McClurg & Co., Chicago. 1911. 7½ x 5.

A great and ancient land without a name, the largest racial collocation in the world without a common language, it is small wonder that China is an ever present mystery. Its present time of trouble is bringing its crop of books; they have scarcely as yet begun to come from the presses. In such conditions the first and the last are sure to prove the more valuable; the first because the publishers are still exercising an intelligent choice in the material, the latter because they will represent the more mature judgment of the best authorities. None will dispute the standing of Prof. Goodrich, for to his service in the educational system of Japan he prefaced an experience of life in China which began in 1866 at Swatow, where European influence was at the minimum as compared with other treaty ports.

So far as relates to the greater events of history, those items which find place in annals and in formal record, Prof. Goodrich is commendably discursive. But his account is not on that score to be held superficial. He uses each such event, with which we may be assumed to be familiar, only as an identifying point and he employs it only so far as may serve fitly to introduce his chief objective, the character of the individual Chinaman. It is that which must underlie the course of China in its present upheaval; it is that which must assist us to some sort of comprehension of what is being done in the Middle Kingdom.

The Manchu (Tsing) dynasty has gone down in the present disorder. It ruled just eight years less than the Ming dynasty, which it succeeded; two other dynasties, the brief Mongol (Yüan) and the Sung, take us back to Alfred the Great. Mere dynastic change is trivial in the cycles of Cathay, it has happened so often. Giles's synoptical table presents thirty-nine such upheavals back to the first dynasty contemporary with the father of Noah. It is because this

book reverts to the solidity of life in immemorial China that it is found so interesting and that it has such lasting value.

WILLIAM CHURCHILL.

An Historical Relation of Ceylon, together with somewhat concerning Severall Remarkable passages of my life that hath hapned since my Deliverance out of my Captivity. By Robert Knox. xlviii and 460 pp. Ills., autobiography, index, map.* James MacLehose & Sons, Glasgow, 1911. 12s 6d, 9 x 6.

At last we have the definitive edition of Knox, a work to whose publication Sir Christopher Wren lent his own great name and the credit of the Royal Society, which was translated into many languages, yet which for long has been hard to come by. No matter how much later investigations have disclosed Ceylon to our better knowledge, Knox must forever remain the basis and foundation, for he was the first European to reveal the ancient Taprobane. The present editor has performed his task with such reverent touch as marks the work of the great Hakluyt Society. The type chosen fitly suggests the dress of the first edition of 1681, the old cuts are reproduced by modern process, the very title-page with which Richard Chiswell put the new work on sale at the Rose and Crown is offered anew to our sight. To this reprint the editor has annexed the autobiography of Robert Knox which was strangely discovered in 1910 among the treasures of the Bodleian Library. This new material gives us information as to the early years of the author before his famous captivity. But more important is the sea life of Captain Knox after his captivity had dragged through a score of years. Here we find a record of the slave trade. After his own slavery he sees no injustice in setting others in bonds. He gives a view of the Madagascar coast, of Bencoolen in the swamps of Sumatra, of St. Helena, of Barbados, of gale and mutiny and the several haps of the sea, all most interesting in the record of geography when geography was nine-tenths adventure.

WILLIAM CHURCHILL.

The Land of Uz. By Abdullah Mansûr (G. Wyman Bury). xxviii and 354 pp. Map, † ills., appendices. Macmillan & Co., Ltd., London. 1911. \$2.75. 9 x 6.

In introducing this work of a dashing explorer Major General Maitland speaks of "Mr. Bury's lively pages." The defect is fatal. When an untrained writer essays lively pages, the result is inevitably disastrous. Writing still is held the one trade which requires no apprenticeship. It is a pity, for this is a most interesting region over which the author has scouted, and frequently fought with wild men of a wild desert. His field is a small region at the southwestern tip of Arabia, Aden and the hinterland, so far, as he could make his way by force or in disguise in the paths beset by folk who were always thieves and might become marauders. The map which accompanies the text will show the principal details of the country, yet it will not be found altogether successful in illustrating the text when the author chanches to pin himself down to statement of routes traversed and villages visited. Authorities are by no means agreed in establishing a real Job in Yemen or the Hadramaut. The land of Uz may be no more than the scene of a philosophical drama, and that seems to be the light in which critical theology now regards it. But however we may feel about the manner of treatment, the fact remains that these are wholly untrodden paths. Not more than five travelers have ventured into this region at all. Mr. Bury has crossed their tracks here and there, but has never paralleled them, therefore

* Listed under "Historical" on p. 400.

† Listed under "Arabia" on p. 399.

his field is all his own. A German similarly situated would have marched each day nearer his monograph, Mr. Bury comes back with the tale of the joy of fighting and obscures the geographical detail with the smoke of his carbine or his fowling piece. But the geographical detail is there after all.

WILLIAM CHURCHILL.

Stalks in the Himalaya. Jottings of a Sportsman-Naturalist. By E. P. Stebbing. xxviii and 321 pp. Ills. and index. John Lane Co., New York, 1912. \$1. 9 x 6.

This book, a continuation of a previous work by the author on "Jungle By-Ways in India," is an account of game hunting on the slopes of the Himalayas. Descriptions of stalking various animals are intended to illustrate the conditions under which they live and to show their adaptability to the mountain slopes; and the writer selected many which he failed to procure. The first of these stories describes the quest of the goral (goat-antelope) and gives a good picture of the type of country where the goral lives. There are similar accounts of hunting stags, bears, tigers, leopards, serow, "likened to a cross between a cow, donkey, pig and goat," goats and sheep. It is amazing to read of the headlong flight of goats over country which the hunter, with the best of care, cannot follow, and the marvelous performances of the tahr and the markhor, representatives of the goat family, related in the closing chapters of the book, almost stagger belief. A few fine photographs of animals and many amateurish sketches illustrate the book.

R. M. BROWN.

AUSTRALASIA AND OCEANIA.

My Adventures Among South Sea Cannibals. An Account of the Experiences and Adventures of a Government Official among the Natives of Oceania. By Douglas Rannie. 314 pp. Map, ill., index. J. B. Lippincott Co., Philadelphia. 1912. \$3.50. 9 x 6.

Probably for a long time to come the story of Melanesia must be told after much this fashion, and it is a very vivid fashion indeed. We must either take this sort of adventure record by men to whom adventure was all in the day's work, or else we must turn to the missionary record. Honesty compels acknowledgment that the adventurer gives us our best contribution to geographical knowledge. Though coming to light after a long interval, this story of black-birding in the Western Pacific will be noticed to agree most remarkably with Capt. Wawn's book upon the same topic. The two men represent diverse interests in the practice of what was really a slave trade, no matter how much it was sugar coated in phrase. Wawn found his profit in getting his hold most quickly filled with Melanesians to work the Queensland sugar plantations. Rannie was one of the first representatives of the system, always futile, by which Queensland sought to make this virtual slavery pass muster as contract labor. The master of a labor trader and the government agent were always warring forces; each unit transaction resulting in a slave was regarded by the two from opposite ends of the same diameter. Wawn and Rannie seem never to have been ship-mates; in fact, Rannie nowhere mentions him, yet they were in the same region of the Pacific at the same time, and many events will be found common to the two narratives. Each is valuable as sketching in the results of reconnaissance into remote spots of earth which repel exploration and which must long remain neglected. The present reviewer was frequently in that region and met each of

these recorders. With many of the events narrated in each record he became personally familiar and can avouch the honesty of the narrative.

The map which accompanies the story seems to have been inserted because it was some sort of a map of the Western Pacific; it is by no means in accord with the present state of our knowledge of the region and will be found of scant value in illustrating the work. In the matter of spelling, Mr. Rannie is quite phonetic, and probably will impose difficulty upon such as attempt to identify the scenes of his exploits. We have the missionaries to thank for settling upon some system of recording place names and, while on phonetic grounds their system is not perhaps all that could be desired, there is no reason why an author should break away from it. There is this excuse, however, to be noted: the charts of the British Admiralty have not yet adopted the standard spellings, and any man whose activity in the Pacific was exercised aboard ship would incline to the chart spellings.

WILLIAM CHURCHILL.

EUROPE

The Magic of Spain. By Aubrey F. G. Bell. 264 pp. Index. John Lane Co., New York. 1912. \$1.50. 7½ x 5½.

It is the magic of the things seen with an artist's eye and transcribed in a delightful style that will be conveyed to the minds of the readers of this book. Those whose advantage it has been to travel south of the Pyrenees will indeed discern the "parfum du terroir" exhaled from almost every page. How well the author has caught the spirit of the place can be detected even in his style, which, now and then, abounds with the sunny imagery that pervades Spanish literature. Here we have one of the many remnants of Moorish influence still strongly discernible in modern Spain. Mr. Bell might undoubtedly have alluded with greater emphasis to the potency of this Oriental undercurrent permeating Spanish life in explanation of the many customs which he describes so charmingly. Was he not aware of the fact that the many Spanish proverbs he quotes are but offsprings of similar sayings currently used in conversation in Damascus or Bagdad?

The chapters on Spanish literature will give a fair idea of the fundamental strains of naïveté and grandiloquence that hold sway over the Spanish mind. Life and Nature are looked upon to-day in Spain much in the light in which an inhabitant of medieval Europe saw them. Therein, perhaps, lies a good deal of the country's and the people's attractiveness. However it be, a full measure of this semi-Oriental and fascinating spell is given in Mr. Bell's book.

LEON DOMINIAN.

The Sea-Kings of Crete. By the Rev. James Baikie. xiv and 274 pp. Plans, ill., index. Adam and Charles Black, London. 1910. \$2. 8½ x 5½.

To have the legends of Minos, overlord of the Aegean, of Theseus, whose success in solving the problem of the Labyrinth and killing the Minotaur won for him Ariadne, and of the marvelous Daedalus and his ill-fated son taken suddenly from the realm of fancy and placed in the category of history will be somewhat of a surprise to the general reader for whom this book is written. Furthermore, it may be expected that the neophyte in the field of archaeological literature will read with pleasure of the discoveries which tend to humanize Agamemnon and Achilles as they waged war against the stronghold of Priam, but he cannot be blamed if he fails to follow the tenuous thread of so delicate an

argument and finally falls back on the conception he formed when reading the Iliad in school. The book is a compilation from the works of Schliemann, Evans, Murray, Browne, Hogarth and others, and presents a consecutive story which adds greatly to its value as far as the general reader is concerned. Most of the chapters are devoted to the results of excavations in Crete, and the main thread is found in the traditions which clustered around Knossos, the capital of Minos. The story of the Minoan kings is told from all the evidence accumulated at this site and at other places in Crete and on the Mediterranean. The conquest of the sea, the stages of culture during the various periods of Minoan civilization, the inferences concerning the conditions of life under the rulers and the repulses which finally marked the end of the sway of the Cretan kings are presented in so logical and convincing a manner that the discoveries of the archaeologists may now become the property of the general public.

R. M. BROWN.

Cliff Castles and Cave Dwellings of Europe. By S. Baring-Gould. 324 pp. Ills., index. J. B. Lippincott Co., Philadelphia. 1911. \$3.50. 9 x 6.

In this book are descriptions of many localities, under modern governments, where elaborate tunnels form the shelter of people living in various stages of civilization. The accounts of these cave dwellings are amazing, and it is difficult to believe that so primitive a stage of culture exists in highly civilized states of Europe. A reversion to savagery is not uncommon, and in cases it may be explained and condoned; but there is no condemnation too severe for the community which allows a reverted people to bring up children under their degraded status of living. This condition seems not to be unknown in any country, and minute accounts are given of these modern troglodytes in France, England and Scotland. There are also many instances where tunnels under the ground and in cliffs were used as habitations by refugees who were fearful of their lives under the stress of tyrannical states of society. A large number of cliff castles, subterranean churches, rock hermitages, rock monasteries, dens of robbers and rock sepulchres are minutely described by pictures, drawings and text. The work shows a vast amount of investigation, and no feature of the conditions of life in the caves of Europe seems to have been neglected. It is undoubtedly the most complete account of troglodyte life in historic times that has been published.

R. M. BROWN.

EDUCATIONAL

High School Geography. Physical, Economic, and Regional. By Charles R. Dryer. Parts I and II. Physical and Economic. 340 pp. Maps, ills., index. American Book Co., New York. 1911. \$1.20. 8 x 5½.

This is the first book of its type to appear. School men and geographers have been recommending that high school geography be "humanized" by the omission of the less practical phases of physical geography and substitution thereof of material on economic and regional geography. In this book Prof. Dryer gives eighteen chapters to physical geography and four to economic geography. A second book, on regional geography, is soon to appear. The two will constitute a one-year course.

The book is interesting in what it omits as well as in what it includes. Under the single heading—The Land—the author compresses Structure and Relief, Plains, Plateaus, Mountains, Hills, Valleys, Volcanic Lands and Earthquakes—

topics which make up a half dozen chapters in the usual text book. Dynamic processes come in for rather full treatment. Soil receives a short chapter (10 pages), and climate a long one (24 pages). The Sea, Coasts and Ports all together receive less space than Gradation by Running Water. The work of Ground Water and Wind are very briefly treated. Practically every topic includes a discussion of the *Economic Relations*. The geographical distribution of plants, animals and man has from 10 to 12 per cent. of the space. Natural resources, food, clothing, constructive materials, and the industries get nearly 20 per cent.

The topics omitted and those selected for treatment have been chosen with good judgment. The moderate size of the book is in its favor. The maps and other illustrations are excellent. More than twenty-five maps in colors are included. In style and diction the book seems better suited to mature readers than to young pupils in the high school. The treatment is terse, and the subject matter is thoroughly dependable, but the facts are not presented in so interesting a way as could be wished.

R. H. WHITBECK.

Physiography for High Schools. By Albert L. Arey, Frank L. Bryant, William W. Clendennin, and William T. Morrey. vi and 438 pp. Maps, ills., appendix. D. C. Heath & Co., New York. 1911. \$1.25. 8½ x 5½.

The authors are teachers in New York City high schools. Being the first modern physical geography written by high school teachers, one is anxious to discover if it differs essentially from the books written by college teachers for high school use. It does not appear that in either language or subject matter the book is easier or simpler than other physical geographies. The book is a fusion of the old ideas of physical geography and the newer ideas. The authors say frankly that they intentionally introduce topics which are usually treated under Astronomy, Geology, and Meteorology because high school pupils ought to study them. In this respect the book returns to the type in use a generation ago. More than usual attention is given to the economic phases of the topics treated, and this is highly commendable. Even more attention might well have been given to the economic side. In this particular the book reflects the newest ideas advanced by friends of physical geography.

Some of the illustrations are good and some are poor. There are few colored maps. Questions follow each chapter. The book is plainly modeled on the New York state syllabus. At least a brief treatment of land forms, soil, rocks and streams should come earlier in the book for the sake of autumn field trips. On the whole, the book is well balanced and sane. It represents both reactionary and progressive tendencies.

R. H. WHITBECK.

PHYSICAL GEOGRAPHY

Earth Features and Their Meaning. An Introduction to Geology. For the Student and the General Reader. By William Herbert Hobbs. xxxix and 506 pp. Maps, ills., index. The Macmillan Co., New York. 1912. \$3. 9 x 6.

A book of thirty-one chapters and several appendices, giving in a simple way and without too many technicalities the outline of modern geologic theory and knowledge. The earlier chapters deal with the figure of the earth, the study of rock materials, rock structures, earthquakes and earth movements, vulcanism, weathering and the other erosive processes, with a special emphasis on glaciation; the later chapters include the study of lake basins, lakes, and the origin

and forms of mountains. Nine chapters are devoted to glaciation and the attending phenomena.

The book is simply and, as a rule, interestingly written. It is well illustrated, largely by wood cuts, and by a few selected half tones, contains a suitable series of references at the end of each chapter, and ought to form an excellent reading book for beginning pupils in college geology.

Modern theory is well summarized, and certain of the debated but interesting problems of geology are considered adequately, giving the various points of view held by different authorities, and with an excellent summary. This is particularly true of the chapters devoted to glaciation and the story of Niagara.

The author, as is to be expected, because of his special interest has devoted considerable attention to the phenomena of earthquakes and to the effect of faults in the earth's crust. The book is an excellent reference volume for students or laymen who are interested in a simple outline of geology with no thought of becoming specialists in the field. The excellent line diagrams in many places add materially to the clearness of the context. The volume has been tested in class work and should prove its worth.

R. E. DODGE.

Revue de Glaciologie, No. 3 (Avril 1903-1er Janvier, 1907). Par Charles Rabot. 343 pp. Maps,* ills. Mémoires de la Soc. Fribourgeoise des Sciences Naturelles: Géologie et Géographie, Vol. 5, 1909.

These extremely valuable digests by Prof. Rabot, begun in the *Annales du Club Alpin Français* in 1902 to cover the events of the preceding year, and continued as No. 2 in the following year, are now issued in the third number to cover the four years from 1903 to the beginning of 1907. The subject of oscillation of glacier fronts is, however, brought up only to July, 1906.

There is a decided advantage in covering in a single number the longer period, since this permits of a greater differentiation of subjects as well as of a more satisfactory correlation of the data. The first chapter of the new booklet is devoted to snow and the measurements of snowfall; the second gives a review of general works which treat of glaciers and especially their physics and dynamics; the third section is concerned with glacial geography and includes references to the exploration of glaciers in many lands; while the fourth and last section is devoted to the variations in the advance or retreat of glaciers from 1903 to July, 1906. A work of this character by an authority like Prof. Rabot is one which no student of glaciers should be without, and it is to be hoped that means will be found for the continuation of these valuable summaries.

WM. H. HOBBS.

GENERAL

Correspondence d'Alexandre de Humboldt avec François Arago (1809-1853). Par Dr. E. T. Hamy. xvi and 377 pp. Ills., index. E. Guilmoto, Paris. 1908. 3 fr. 50. 7½ x 4½.

Not one of the least meritorious achievements of the late Dr. E. T. Hamy has been the publication of correspondence between justly celebrated men of science of the past century. We have already reviewed in the *Bulletin* the collection of letters addressed by Humboldt to his friend and companion Bonpland, sent to the latter mostly while he was in a sort of "durance vile" in

* Listed in *Bull.*, Vol. 44, April, 1912, under "Alaska" on p. 316 and under "France" and "Norway" on p. 319.

Paraguay, under the despotic rule of Francia. This volume contains Humboldt's letters to one who stood as near to him, if not nearer, than the French botanist—to one to whom he was attached through common interest in studies to which he was more closely linked. Moreover, Arago, residing at Paris, which, for Humboldt, was as much of a home as Berlin, lived much nearer than the mewed-up friend at Asuncion, and intercourse was more frequent and more easy and regular. In addition to their common interest in science, Humboldt was drawn to Arago also by the influence which the early part of the lives of both had exercised. While the former's political ideas were of a more temperature nature than those of Arago, he still remained always under the impression which the maxims of 1789 had very distinctly colored and, while by birth an aristocrat (as well as in manners), he upheld a theoretical liberalism that enabled him to maintain intimate relations with extremists without jeopardizing his relations to King and Court, to which he was attached both by tradition and circumstance.

The collection embraces the period indicated above. It contains 124 numbers, the last one dated March 14, 1853. Only 115 are addressed to Arago, and even the first two (from 1809 and 1814) are given in abstract, the originals being lost. The nine letters at the end are addressed to members of the family of the deceased astronomer, and to several of his friends. The style of the documents justifies an observation made to me by somebody, about the French works of Humboldt: "It is beautiful German, written in French."

While the letters show the greatest intimacy between the two great men and extend over nearly every field of human activity, it appears from them that Humboldt had imbibed the true spirit of diplomacy, which was very well expressed to me once by a friend, a distinguished and thoroughly trained Brazilian diplomat of high standing. He said: "To say what it is your duty to say, and not to tell what must not be told, is the sum and substance of diplomacy." Humboldt freely alludes to public affairs, to political matters, in his communications, but he never "tells" anything but what is or can be public. With his intimate relations with the Prussian monarchs, and the constant intercourse with his brother Wilhelm and other diplomats, Alexander had conceived the true methods of diplomatic intercourse. Hence the political side of his correspondence is clear of confidential indiscretions, and distinct from the private correspondence published many years ago. Varnhagen von Ense, to whom that correspondence was addressed, was a diplomat himself, and many points could be touched upon with him on public affairs, and were alluded to. Arago was astronomer and physicist, hence letters to him, while containing also talk which might be called gossip, bear always upon scientific matters, even when gossip enters into their composition. The correspondence with Varnhagen von Ense, while not harmful, should never have been published, or only after very careful scrutiny, which was not observed by its editor.

The scientific interest of this volume is considerable. It presents the progress of science in Europe for nearly half a century and during a time when physical and natural sciences obtained the impulse under which they are moving to-day. Almost every branch is represented, geography coming in for a large share. At the same time it shows with what close and constant attention Humboldt followed the labor of others in every country; what a large part he had in fostering and assisting their progress, and what a sympathetic interest he took in everything and everybody that deserved it. While himself a student of paramount activity and solidity of thought and action, he was at once a "pro-

moter" of the right sort, not a modern speculator upon the goods and means of kind souls who are mulcted for the benefit of enterprising schemers under the pretext of "advancement of science," for their personal benefit.

Humboldt had hardly any means of his own, since he sacrificed his patrimony for the South American exploration of 1799 to 1804, but he justly had the ear of wealthy patrons and made use of his position, not merely for himself, but for everyone he considered worthy of being sustained.

The correspondence is a chronicle of the development of scientific research, coupled with personal incidents making it additionally valuable in a biographical sense. And the man to whom it was addressed not only understood it thoroughly, but acted his part worthily in the same direction. There is nowhere a trace of jealousy, of covert disappointment at the discoveries of others. When political causes obstructed the path of Melloni, it was Humboldt who employed his standing with court and diplomacy to save him from distress; when young men loomed up in a manner showing prospective merit, and needful of protection in order to live and develop the resources of mind, he endeavored to find protectors for them, through his extensive acquaintance and great influence. Of all this the letters bear abundant testimony, without boasting, in a simple, perfectly natural manner, which shows that in helping others he thought only of performing a duty to science, by assisting its adepts. He follows with a keen interest every new step in physical science, aids in mathematical work, even at an advanced age, gives advice to those deserving it, but quite as often begs of his friend, not only opinions, but directions on many problems of research.

The letters abound in acknowledgements of gratitude to those who aided him in many ways. The King of Prussia deservedly heads the list. In the letters from eastern Russia the extraordinary munificence and valuable support, which the Imperial Russian government favored him with on his important journey to Central Asia, are duly acknowledged. If it should be true (Humboldt, in his correspondence with Varnhagen von Ense, treats it rather as a joke) that England opposed his intention of entering India, thus blocking his favorite purpose, then the deportment of Russia would be in highly favorable contrast with that of the British government. In the present volume Humboldt makes no mention of it. His allusions to English scientists are not frequent, but usually courteous.

The great intimacy between Humboldt and Arago causes the former to allude to contemporaries and collaborators without reserve. In such remarks he discriminates between the scientific capabilities and labors and the personality of the man. The former are usually treated from a standpoint that would be encouraging to the individual; personal character and peculiarities are often the subject of amusing and even caustic, observations. Humboldt, like everybody else, had his likes and dislikes, and in either case they may prove mistakes. Hence we refrain from mentioning names. But these personal allusions are not merely interesting, they are often quite valuable. Distinguished men, scientists for example, are mostly known from the outside so-to-say, from what is public about their achievements. Here we have, in a form that was only intended to be private and even confidential, a great number of notes and appreciations about contemporaries, by one who judged them from various points of view, and who stood on a level of independence that gives exceptional weight to his judgment about persons. It is often gossip, but never indifferent. We see, in these forty-four years of talk about events and people, the scientific world

of that period passed in review by one who was not a mere looker-on, but an active and very prominent participant; who knew what he was saying and the men of whom he spoke. Likes as well as dislikes are sometimes at fault, but are permitted as long as the motives are not unworthy. Of this, in the case of Humboldt, no trace can be found.

Impressions gathered in younger days are lasting and render sympathies and antipathies very durable. So the feeling of Humboldt for France and Paris, especially Paris, is marked to the last. While German in spirit and method of thought, he clings to French ideas and recollections with a sentimental tenacity, that is the result of the effusive type of feeling prevalent at the time when his career as explorer began. This effusiveness is equally marked in expressions of attachment and tenderness for his life-long friend. It is noteworthy and characteristic of Humboldt that it was not Arago that sought him but that it was he who, convinced of Arago's ability, made the first advances when the young astronomer was yet hardly known. Arago was seventeen years younger than Humboldt, and only twenty-three when the latter first wrote to him, at the age of forty.

The late Dr. Hamy, the editor, has increased the already great value of the book by his prefatory remarks and especially by the numerous biographical notes. They are, in fact, a brief biographical cyclopedia of such proper names as appear in the correspondence. The book as a whole does honor to the writer of the letters, to the man to whom they are addressed, and to its able and thoroughly informed editor.

AD. F. BANDELIER.

Die Hauptsprachen unserer Zeit. Mit einer Einleitung: "Die wichtigsten Sprachen der Vergangenheit" sowie mit zahlreichen Schrift und Sprachproben und einer Sprachenkarte von Dr. Ludwig Harald Schütz. ix and 226 pp. Ills., map, index. J. St. Goar, Frankfurt am Main. 1910. Mk. 6. $9\frac{1}{2} \times 6\frac{1}{2}$.

The book contains short characteristics of the linguistic qualities, script, and literature, of the principal languages of the world. After an introductory chapter on the dead languages: Greek, Latin, Hebrew, Phœnician, Egyptian, Assyrian, Sanskrit, and the extinct Indian languages of Mexico, the author takes up the languages which are spoken to-day, in order of the number of people who use them. First, the languages of Eurasia: Chinese, English, Hindustani, German (inclusive of Dutch, Swedish, and Danish); the Slav languages; French, Japanese, Spanish, Malay, Italian, Turkish (including Hungarian), and Portuguese. The fact that the author associates Breton with French and the Basque dialect with Spanish, as well as the entire omission of Icelandic and Lithuanian, proves that his object was not to give a philologically safe division of his subject. African languages are divided into Semitic, Hamitic, Sudanese, Bantu, Hottentot-Bushman, and Hova; American languages into Eskimo and Indian (the latter illustrated by the example of the Dakota idiom) for North America, Nahuatl and Maya languages for Central America, and Tupi and Peruvian (Quichua) for South America. In Australia, several native dialects of Queensland, New South Wales, Victoria, West Australia and South Australia are briefly described, together with the languages of the Papuans of New Guinea and New Mecklenburg. A chapter on scientific, artistic, and artificial languages completes the array.

In the case of each of these languages, the alphabet, rules for pronunciation, principal characteristics of grammar and syntax, and examples from its litera-

ture are given, the literary examples in the original form, in Latin type, and in a translation.

It goes without saying that it is impossible for a novice to gain an appreciation or even more than a superficial idea of any one language by means of such cursory instruction, while readers acquainted with the respective languages have better resources with which to supplement their knowledge. But the geographer who struggles with the pronunciation of foreign names will find the book quite helpful, because it includes so large a number of idioms. M. K. GENTHE.

OTHER BOOKS RECEIVED

NORTH AMERICA

These notes do not preclude more extended reference later

THE RECORD OF A CITY. A Social Survey of Lowell, Massachusetts. By George F. Kenngott. xiv and 257 pp. Map, ills., index. The Macmillan Co., New York, 1912. \$3. 9 x 6. [An exhaustive study of social conditions in a large manufacturing city. Dealing with the past of Lowell, its present population, the housing of the operatives, health, the standard of living, industrial conditions, social institutions, recreations, etc.]

CANADA. The Golden Land. The Story of Present Day Occupation of the Great West. By Arthur E. Copping. xvi and 263 pp. Ills. Hodder & Stoughton, London. George H. Doran Co., New York. 1911 (?). \$1.50. 8 x 5½. [Informing sketches of life, especially on the pioneer farms of the new wheat lands in the western provinces, with chapters on British Columbia and Ontario. Colored illustrations.]

PIONEERS IN CANADA. By Sir Harry Johnston. 328 pp. Maps, ills. Blackie & Son, Ltd., London, 1912. 6s. 8½ x 6. [Graphic descriptions of the work of Cartier, Champlain, Hearne, Mackenzie, and other leading explorers, with much information about the regions explored and the wild life they supported.]

CENTRAL AND SOUTH AMERICA

CHILE AND HER PEOPLE OF TO-DAY. An Account of the Customs, Characteristics, Amusements, History and Advancement of the Chileans, and the Development and Resources of Their Country. By Nevil O. Winter. xii and 411 pp. Map, ills., appendices, index. L. C. Page & Co., Boston, 1912. \$3. 8 x 5½.

CENTRAL AND SOUTH AMERICA. Vol II, Central America and West Indies. By A. H. Keane. Edited by Sir Clements Markham. 2nd Edition. Stanford's Compendium of Geography and Travel (New Issue). xxvi and 496 pp. Maps, ills., appendix, index. Edward Stanford, London, 1911. 15s. 8 x 5½. [On the whole, the additions to our information concerning Central America and the West Indies since the first issue in 1902 are recorded, with, however, some mistakes in spelling and some statements now antiquated, carried over from the earlier volume.]

ASIA

THE CIVILIZATION OF CHINA. By Herbert A. Giles. Home University Library. 256 pp. Bibliogr., index. Henry Holt & Co., New York. 1911. 50 cents. 6½ x 4½. [Gives the outline of Chinese civilization from the earliest times to the present period of transition.]

AROUND THE BLACK SEA, Asia Minor, Armenia, Caucasus, Circassia, Daghestan, the Crimea, Roumania. By William Eleroy Curtis. 456 pp. Map, ills., index. George H. Doran Co., New York, 1911. 8½ x 5½.

RECUEIL DES TRAITÉS CONCLUS PAR LA FRANCE EN EXTRÊME-ORIENT (1684-1902). Par L. de Reinach. Vol. 1, 442 pp. Vol. 2 (1901-1907), 146 pp. Ernest Leroux, Paris. 1907. 10 x 6½.

TURKESTAN: "The Heart of Asia." By William Eleroy Curtis. 344 pp. Map, ill., index. George H. Doran Co., New York, 1911. 8½ x 5½.

EUROPE

NORDOST-DEUTSCHLAND (von der Elbe und der Westgrenze Sachsens an) nebst Dänemark. Handbuch für Reisende. Von Karl Baedeker. xxx and 496 pp. Maps, plans, index. Karl Baedeker, Leipzig. 1911. Mk. 6. 6 x 4½.

CYPRN. Eine Darstellung seiner Landesverhältnisse, besonders in politischer und wirtschaftlicher Beziehung. Von Davis Trietsch. Angewandte Geographie. 4. Serie. 1. Heft. 109 pp. Map, ill., index. Heinrich Keller, Frankfurt a. M., 1911. Mk. 4. 8½ x 6 [A model geographical study, with emphasis on industrial relations.]

VOYAGE A L'ÎLE MAJORQUE. Par Jules Leclercq. 281 pp. Map, ill. Plon-Nourrit et Cie, Paris, 1912. 7½ x 5. [An excellent study and description of one of the most interesting islands in the Mediterranean.]

CAMBRIDGE COUNTY GEOGRAPHIES. Berkshire. By H. W. Moncton. x and 168 pp.; Carnarvonshire. By J. E. Lloyd. xi and 171 pp.; East London. By G. F. Bosworth. x and 256 pp. Index; Gloucestershire. By H. A. Evans. ix and 155 pp.; The Isle of Man. By the Rev. John Quine. x and 178 pp.; Monmouthshire. By Herbert A. Evans. ix and 183 pp.; Worcestershire. By Leonard J. Wills. ix and 154 pp.; University Press, Cambridge, 1911, except Gloucestershire, 1909. G. P. Putnam's Sons, New York. 45 cents each. 7½ x 5. [Maps, diagrams and illustrations in each. The general editor is Dr. F. H. H. Guillemard. Geography, natural history, antiquities, resources, etc., are included. The treatment is both sound and popular. Colored maps show the physical and geological features of each county.]

GENERAL

MY ATTAINMENT OF THE POLE. Being the Record of the Expedition that First Reached the Boreal Center 1907-1909. With the Final Summary of the Polar Controversy. By Dr. Frederick A. Cook. Illustrations, appendix and index. xx and 604 pp. The Polar Publishing Co., New York, 1911. 10 x 7½.

THE UNOCCUPIED MISSION FIELDS OF AFRICA AND ASIA. By Samuel M. Zwemer. xvi and 260 pp. Maps, ill., index, appendices. Student Volunteer Movement for Foreign Missions, New York, 1911. 8 x 5½. [This survey includes Oceania. The maps as well as the text bring vividly to notice the vast spaces that have never yet seen a protestant missionary.]

DIE DEUTSCHEN KOLONIEN (Land und Leute). Von Dr. Adolf Heilborn. Dritte, verbesserte und vermehrte Auflage. Aus Natur und Geisteswelt. 98. Bändchen. iv. and 180 pp. Maps, ill., bibliogr. B. G. Teubner, Leipzig, 1912. 7½ x 5. [An excellent short account of the German colonies, and their native inhabitants. It would for all purposes be a good résumé of these over-sea possessions if more space had been given to development under the German régime. This important topic, however, is very cursorily treated.]

THE PRINCIPLES AND OBJECTS OF GEOLOGY, with special Reference to the Geology of Egypt. By W. F. Hume. 25 and ix pp. Ills. Survey Dept., Ministry of Finance, Egypt. Cairo, 1911. 5 P. T. 10½ x 7 [Treaty of rocks, their origin, deformation, physical and chemical transformation, igneous and metamorphic rocks, etc.; with illustrative text drawn from the geological study of Egypt. Not too technical for general reading.]

HEREDITY IN RELATION TO EVOLUTION AND ANIMAL BREEDING. By William E. Castle. xii and 184 pp. Ills. bibliogr., index. D. Appleton & Co., New York, 1911. \$1.50. 7½ x 5. [An authoritative treatment of the subject dealing largely with the operations of Mendel's law of heredity.]

DER URSPRUNG DES MENSCHEN oder die gegenwärtigen Anschauungen über die Abstammung des Menschen. Von Prof. Dr. Alois Schmitt. xii and 118 pp. Index. B. Herder, St. Louis, Mo., 1911. 65 cents. $9\frac{1}{2} \times 6\frac{1}{2}$. [Criticises some present views. Especially valuable for its excellent statement of the facts relating to the origin of man that are now generally recognized.]

GEOGRAFIA GENERALE (Fisica, Biologica, Antropica). Di Cap.^{no} Giannitràpani. xxviii and 368 pp. Maps, ills. R. Bemporad & Figlio, Florence, 1912. $8\frac{1}{2} \times 5\frac{1}{2}$. [A careful and good work, covering all phases of the subject that are essential to general geographical culture.]

JAHRBUCH ÜBER DIE DEUTSCHEN KOLONIEN. Herausgegeben von Dr. Karl Schneider. 4. Jahrgang. 257 pp. Maps, ill., index. G. D. Baedeker, Essen, 1911. Mk. 5. 9×6 . [A geological map of Togo is one of the features. The principal papers will be noted in "Current Geographical Papers."]

WHO'S WHO IN SCIENCE (international) 1912. Edited by H. H. Stephenson. xvi and 323 pp. Index. The Macmillan Co., New York. 9×6 . [Valuable in most respects, but worthless as a record of scientific geographers. Very few of the leading geographers of the world, men of international reputation, eminent in the universities and in their scientific output, are included.]

MEYERS GROSSES KONVERSATION-LEXIKON. Ein Nachschlagewerk des allgemeinen Wissens. Sechste, gänzlich neubearbeitete und vermehrte Auflage. Vol. 23, Jahres-Supplement, 1910-1911. 1008 pp. Maps, ills. Bibliographisches Institut, Leipzig und Wien, 1912. \$2.68. $10 \times 6\frac{1}{2}$. [Stands in the front rank of annual compendiums of the world's events and progress.]

CURRENT GEOGRAPHICAL PAPERS

NORTH AMERICA

The Continent and Parts of it

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NANSEN, F. The Norsemen in America. Maps, ills. *Geogr. Journ.*, Vol. 38, 1911, No. 6, pp. 557-580.

NICKLES, J. M. Bibliography of North American Geology for 1910. With Subject Index. 179 pp. *Bull.* 495, U. S. Geol. Survey, 1911.

SMITH, J. P. The Occurrence of Coral Reefs in the Triassic of North America. *Amer. Journ. of Sci.*, Vol. 33, 1912, No. 194, pp. 92-96.

United States

BARROWS, H. K., AND OTHERS. Penobscot River Drainage Basin. *Water-Supply Paper* 261, pp. 63-79. U. S. Geol. Survey, 1911.

BARROWS, H. K., C. C. COVERT and R. H. BOLSTER. Surface Water Supply of the United States 1909. Part I. North Atlantic Coast. Ills, index. 309 pp. *Water-Supply Paper* 261, U. S. Geol. Surv., 1911.

BOWIE, W. Triangulation along the Ninety-Eighth Meridian, Nebraska to Canada, and Connection with the Great Lakes. 342 pp. Maps. *Appendix 4, Report 1911*, Coast and Geodetic Surv., 1912.

CALVIN, S. The Iowan Drift. Ills. *Journ. of Geol.*, Vol. 19, 1911, No. 7, pp. 577-602. Chicago.

DILLER, J. S., E. S. LARSEN, AND OTHERS. Gold and silver. Maps, geol. sections, plans, and ills. 122 pp. Advance Chapter from Contr. to Econ. Geol., 1910. *Bull.* 470-B, U. S. Geol. Surv., 1911.

FAIRIS, R. L. Results of Magnetic Observations made by the Coast and Geodetic Survey between July 1, 1910, and June 30, 1911. Dept. of Comm. and Labor. Appendix No. 3, *Rep.* for 1911, pp. 79-158.

FLYNN, N. F. Flora of Burlington and Vicinity. A list of the Fern and Seed Plants Growing without cultivation. Index. 124 pp. *Contr. to the Botany of Vermont* IX, Burlington, 1911.

HEADEN, W. P. The Occurrence and Origin of Nitrates in Colorado Soils, some of their Effects, and What they Suggest. *Proc. Colorado Sci. Soc.*, Vol. 10, 1911, pp. 99-122. Denver.

HODGE, F. W. Report of the Bureau of American Ethnology. *Ann. Rep. Bd. of Regents of Smiths. Inst.*, 1910, pp. 46-56. Washington, 1911.

LEIGHTON, M. O. The National Aspect of Swamp Drainage. Ills. *Amer. Forestry*, Vol. 18, 1912, No. 1, pp. 3-13.

MACFARLANE, J. J. United States Manufactures. Extent and Growth of Industry as Revealed by Census of 1910. Analysis of Industry by States. Map, diagram. *Commerc. Amer.*, Vol. 8, 1912, No. 8, pp. 9-13. Philadelphia.

MUNN, M. J., C. H. WEGEMANN AND OTHERS. Petroleum and Natural Gas. Advance Chapter from Contr. to Econ. Geol., 1910. Part II.—Mineral Fuels. 132 pp. Maps and sections. *Bull. 471-A*, U. S. Geol. Surv., 1912.

WALCOTT, C. D. Report of the Secretary of the Smithsonian Institution, for the year ending June 30, 1910. *Ann. Rep. Bd. of Regents of Smiths. Inst.*, 1910, pp. 5-39. Washington, 1911.

— Supply and Distribution of Cotton for the year ending Aug. 31, 1911. Diagram. *Bull. 113*, *Bur. of the Census*, pp. 5-21. 1911.

— Survey Publications on Phosphates and other Mineral Fertilizers. *Bull. 470*, U. S. Geol. Surv., pp. 482-483. 1911.

Mexico

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Topographic Sheets

(Including Combined and Special Topographic Maps)

Alaska. Topography of Kasan Peninsula, Prince of Wales Island, Alaska. Surveyed in 1907-1908. 1:62,500. 55°40' - 55°25' N.; 132°35.3' - 132°5.0' W. Contour interval 50 ft. Edition of Dec. 1911. Alaska Sheet No. 540A.

California. (a) Browns Valley Quadrangle. Surveyed in 1909. 1:31,680. 39°15'0" - 39°7'30" N.; 121°30'0" - 121°22'30" W. Interval 5 ft. Edit. of Nov. 1911.

(b) Landlow Quad. Surveyed in 1909-1910. 1:31,680. 39°30'0" - 39°22'30" N.; 121°52'30" - 121°45'0" W. Interval 5 ft. Edit. of Dec. 1911.

[Belong to the series of half-mile-to-the-inch maps of the Sacramento Valley].

- California—Nevada.* Bridgeport Quad. Surveyed in 1905-1909. 1:125,000. $38^{\circ}30' - 38^{\circ}0' N.$; $119^{\circ}30' - 119^{\circ}0' W.$ Interval 100 ft. Edit. of Dec. 1911.
- Colorado.* (a) Montrose Quad. Surveyed in 1901-1902 and 1909. 1:125,000. $38^{\circ}30' - 38^{\circ}0' N.$; $108^{\circ}0' - 107^{\circ}30' W.$ Interval 100 ft. Edit. of Nov. 1911.
- (b) Mt. Jackson Quad. Surveyed in 1907-1909. 1:125,000. $39^{\circ}30' - 39^{\circ}0' N.$; $107^{\circ}0' - 106^{\circ}30' W.$ Interval 100 ft. Edit. of Nov. 1911.
- Idaho—Montana.* Cataldo Quad. Surveyed in 1901, 1905 and 1909. 1:125,000. $48^{\circ}0' - 47^{\circ}30' N.$; $116^{\circ}30' - 116^{\circ}0' W.$ Interval 100 ft. Edit. of Nov. 1911.
- Illinois.* Elizabeth Quad. Surveyed in 1909. 1:62,500. $42^{\circ}30'30'' - 42^{\circ}15'0'' N.$; $90^{\circ}15' - 90^{\circ}0' W.$ Interval 20 ft. Edit. of Oct. 1911.
- Iowa.* Knoxville Quad. Surveyed in 1908-1909. 1:62,500. $41^{\circ}30' - 41^{\circ}15' N.$; $93^{\circ}15' - 93^{\circ}0' W.$ Interval of 20 ft. Edit. of Jan. 1912.
- Kansas—Missouri.* Leavenworth and Vicinity. Surveyed in 1906-1909. 1:62,500. $39^{\circ}30' - 39^{\circ}13' N.$; $95^{\circ}8'35'' - 94^{\circ}45'0'' W.$ Interval of 20 ft. Edit. of Oct. 1911.
- Louisiana.* Lake Providence Quad. Surveyed in 1909. 1:31,680. $32^{\circ}52'30'' - 32^{\circ}45'0'' N.$; $91^{\circ}15' - 91^{\circ}5' W.$ Interval 5 ft. Edit. of Oct. 1911.
- [Belongs to the series of half-mile-to-the-inch maps of the flood-plain of the Mississippi].
- Maine—New Hampshire.* Kezar Falls Quad. Surveyed in 1909-1910. 1:62,500. $44^{\circ}0' - 43^{\circ}45' N.$; $71^{\circ}0' - 70^{\circ}45' W.$ Interval 20 ft. Edit. of Dec. 1911.
- Montana.* (a) Blackfoot Quad. Surveyed in 1907. 1:125,000. $49^{\circ}0' - 48^{\circ}30' N.$; $113^{\circ}0' - 112^{\circ}30' W.$ Interval 20 ft. Edit. of Dec. 1911.
- (b) Topographic Map of Glacier National Park, Montana. Surveyed in 1900-1904 and 1907-1910. 1:125,000. $49^{\circ}0' - 48^{\circ}13' N.$; $114^{\circ}30' - 113^{\circ}10' W.$ Interval 100 ft. Edit. of Aug. 1911.
- [A splendid map of this newly created National Park which includes the southern end of that part of the northern Rocky Mountains which is generally known as the Canadian Rockies and, with it, the southernmost of the glaciers which have given the more northern ranges their reputation for scenic beauty. The part of the map south of $48^{\circ}30'$, or immediately north of the Great Northern R.R., is new. The remainder has been combined from the Kintla Lakes, Chief Mountain and Browning quadrangles].
- New York.* Canton Quad. Surveyed in 1910. 1:62,500. $44^{\circ}45' - 44^{\circ}30' N.$; $75^{\circ}15' - 75^{\circ}0' W.$ Interval 20 ft. Edit. of Nov. 1911.
- North Carolina.* Lincolnton Quad. Surveyed in 1909. 1:62,500. $35^{\circ}30' - 35^{\circ}15' N.$; $81^{\circ}30' - 81^{\circ}15' W.$ Interval 20 ft. Edit. of Nov. 1911.
- North Dakota.* Ray Quad. Surveyed in 1906 and 1909. 1:125,000. $48^{\circ}30' - 48^{\circ}0' N.$; $103^{\circ}30' - 103^{\circ}0' W.$ Interval 50 ft. Edit. of Nov. 1911.
- Ohio.* Lorain Quad. Surveyed in 1909. 1:62,500. $40^{\circ}30' - 40^{\circ}15' N.$; $84^{\circ}30' - 84^{\circ}15' W.$ Interval 20 ft. Edit. of Sept. 1911.
- Pennsylvania.* Franklin Quad. Surveyed in 1909. 1:62,500. $41^{\circ}30' - 41^{\circ}15' N.$; $80^{\circ}0' - 79^{\circ}45' W.$ Interval 20 ft. Edit. of Nov. 1911.
- West Virginia.* Madison Quad. Surveyed in 1908-1909. 1:62,500. $38^{\circ}15' - 38^{\circ}0' N.$; $82^{\circ}0' - 81^{\circ}45' W.$ Interval 50 ft. Edit. of Aug. 1911.
- Wyoming.* (a) Canyon Quad. Surveyed in 1884-85; partial revision, 1910. $45^{\circ}0' - 44^{\circ}30' N.$; $110^{\circ}30' - 110^{\circ}0' W.$ Interval 100 ft. Edit. of July 1911.
- (b) Gallatin Quad. Surveyed in 1883-85; partial revision in 1910. 1:125,000. $45^{\circ}0' - 44^{\circ}30' N.$; $111^{\circ}0' - 110^{\circ}40' W.$ Interval 100 ft. Edit. of Sept. 1911.
- (c) Lake Quad. Surveyed in 1885; partial revision in 1910. 1:125,000. $44^{\circ}30' - 44^{\circ}0' N.$; $110^{\circ}30' - 110^{\circ}0' W.$ Interval 100 ft. Edit. of Sept. 1911.
- [Revised edition of three of the four quadrangles which comprise Yellowstone National Park].

Geologic Sheets Accompanying Folios of the Geologic Atlas of the United States

- Maryland—West Virginia—Pennsylvania.* (a) Hancock Quadrangle. Surveyed in 1904-10. 1:62,500. $39^{\circ}45' - 39^{\circ}30' N.$; $78^{\circ}15' - 78^{\circ}0' W.$ (1) Areal Geology. Contour interval 20 ft. 21 colors. Edition of Oct. 1910. (2) Structure Sections. 23 colors. Edit. of Dec. 1910.
- (b) Pawpaw Quad. Surveyed in 1904-10. 1:62,500. $39^{\circ}45' - 39^{\circ}30' N.$; $78^{\circ}30' - 78^{\circ}15' W.$ (1) Areal Geology. Interval 20 ft. 18 colors. Edit. of Oct. 1910. (2) Structure Sections. 18 colors. Edit. of Dec. 1910.
- Accompany "Pawpaw-Hancock Folio (No. 179)" by G. W. Stose and C. K. Swartz, 1913.
- Pennsylvania.* Claysville Quad. 1:62,500. $40^{\circ}15' - 40^{\circ}0' N.$; $80^{\circ}30' - 80^{\circ}15' W.$ Interval 20 ft. (1) Areal Geology. Surveyed in 1905, 1908-1910. 8 colors. Edit. of March 1911. (2) Structure and Economic Geology. Surveyed in 1905, 1908-1910. 10 colors. Edit. of March 1911. (3) Oil and Gas Surveyed in 1908 and 1908. 14 colors. Edit. of Oct. 1911. Accompany "Claysville Folio (No. 180)" by M. J. Munn, 1912.

Maps Accompanying Publications

- MARYLAND—WEST VIRGINIA—PENNSYLVANIA.* (a) Drainage Map of the Pawpaw and Hancock quadrangles, showing the "trellis" arrangement of the streams. [1:260,000]. $[39^{\circ}45' - 39^{\circ}30' N.$; $78^{\circ}30' - 78^{\circ}0' W.]$.
- (b) Abandoned channel of Potomac River near Pawpaw, W. Va. [1:65,000]. $[39^{\circ}33'3'' - 39^{\circ}30'0'' N.$; $78^{\circ}31'4'' - 78^{\circ}26'0'' W.]$. Interval 50 ft.
- (c) Oxbow cut-off in Sleepy Creek at Johnsons Mill, W. Va., southeast of Berkeley Springs. 5 in. = 1 mile [1:12,672]. $[39^{\circ}34' N.$ and $78^{\circ}12' W.]$. Interval 20 ft.
- Figs. 3, 10 and 11, Pawpaw-Hancock Folio (No. 179), *Geol. Atlas of the U. S.*, 1913.
- PENNSYLVANIA.* (a) Map showing general structural features in southwestern Pennsylvania by contours on the horizon of the Pittsburgh coal. [1:3,900,000]. $[40^{\circ}30' - 39^{\circ}45' N.$; $80^{\circ}30' - 79^{\circ}30' W.]$. Interval 50 ft.
- (b) Sketch of Claysville quadrangle, showing convergence of the top of the Washington limestone and the top of the Gordon sand . . . [1:195,000]. $[40^{\circ}15' - 40^{\circ}0' N.$; $80^{\circ}30' - 80^{\circ}15' W.]$.

- (c) Sketch map of oil and gas fields of western Pennsylvania and adjoining States. [1:2,000,000].
[42°15' - 39°30' N.; 82°15' - 77°40' W.].
Figs. 4, 5 and 6, Claysville Folio (No. 180), *Geol. Atlas of the U. S.*, 1912.

UNITED STATES. [Three maps of the United States, 1:7,000,000, limited by 51° - 25° N. and 120° - 65° W., compiled by Henry Gannett; edition of Nov. 1911.] (a) United States: Base Map. 2 colors. (b) United States: Contour Map. 3 colors. (c) United States: Relief Map. 10 colors.
[Of these standard maps, map (a) shows hydrography and towns only, map (b) also shows contours (interval 500 ft. in the East, 1,000 ft. in the West), while map (c) shows contours with altitude tints. In the present edition of the last map a return has been made to the use of dark tints to designate the highest elevations. The color gamut now runs from olive green through pale green and increasing shades of brown to a deep mauve. The Coastal Plain is thus brought out more strongly than on the previous edition (March 1910), and the exaggerated importance given the 2,000 ft. contour of the Plains in that edition has been reduced. The map has continuously been improved since its inception as PL CVII of the 13th Report of the U. S. G. S. for 1891-92.]

UNITED STATES-CANADA. North America 1:1,000,000. [Sheet] North K 10; Boston. Preliminary proof. 44° - 40° N.; 72° - 66° W. 3 colors. Compiled, engraved and printed by the United States Geological Survey, Washington, Sept. 1911.

[Comment on this, the first sheet of the International Map of the World on the scale of 1:1,000,000 to be published of the United States, will be deferred to a later number of the *Bull.*].

NORTH AMERICA

CANADA

BRITISH COLUMBIA-ALBERTA. Map of New British Columbia Showing Line of Grand Trunk Pacific Railway and Author's [F. A. Talbot's] Route from Wolf Creek to Prince Rupert. [1:1,900,000]. 55°5' - 52°34' N.; 131° - 113° W. Accompanies "The New Garden of Canada" by F. A. Talbot, London, etc., 1911.

ONTARIO-QUEBEC. Northern Ontario: Mineral District. 1:250,000. 49°0' - 46°15' N.; 81°36' - 78°54' W. 2 colors. 2 sheets. Department of the Interior (Ottawa), 1911.
[In execution identical with the sheets of the "Standard Topographic Map". District shown lies between Lakes Nipissing and Abitibi; includes Lakes Timagami and Timiskaming].

UNITED STATES

ILLINOIS. Base Map of Illinois Prepared in Cooperation with the United States Geological Survey. 42°30' - 37°0' N.; 91°33' - 87°32' W. 3 colors. State Geological Survey [of Illinois], 1911.

[Map showing the topologic elements—railroads, township and county boundaries, places, etc.—with great accuracy. Numerous elevations given: U. S. G. S. bench marks to the nearest tenth of a foot, railroad stations to the nearest foot. Based on Land Office plats adjusted to surveys by the U. S. Army Engineers, the Coast and Geodetic Survey, the Mississippi River Commission, etc. In aspect similar to the route maps of the Post Office Department. Copies may be had for 10 cents by applying to the Director, State Geological Survey, Urbana, Ill.].

MEXICO

MEXICO. Mexique. 1:11,000,000. [34° - 14½° N.; 117° - 86½° E.]. Accompanies "Les Etats-Unis du Mexique" by M. de Périgny, Paris, 1911.
[Shows railroads and state boundaries].

CENTRAL AMERICA AND WEST INDIES.

TRINIDAD. Map of the Island of Trinidad originally designed by Capt. Mallet, R. E. Revised and brought up to date from the latest available official & private surveys. 1:89,100. 10°53' - 9°56' N.; 61°57' - 60°51' W. 7 colors. 4 sheets. G. W. Bacon & Co., Limited, London, 1912.
[Large scale map showing railroads, carriage and other roads, wards and county boundaries. Relief indicated in a rather elementary way in the form of "caterpillar" ridges].

AFRICA

MOROCCO. (a) La Chaouia par le Cap'ne Grasset. 1:1,000,000. 34°5' - 32°40' N.; 8°25' - 6°40' W.
(b) Plan de Casablanca et de ses Environs [1:30,000] [33°40' N. and 7°34' W.].
Accompany "A Travers la Chaouia . . ." by Capt. Grasset, Paris, 1911.

ASIA

ARABIA. The Land of Uz [southwestern Arabia]. 12 miles to 1 inch approx. [1:750,000]. [15°15' - 12°45' N.; 42°15' - 47°10' E.]. 1 color. With inset showing limits of main map; 3 colors. Accompanies "The Land of Uz" by Abdallah Mansur (G. Wyman Burry), London, 1911.

CHINA. [Map of Chekiang]. [1:1,800,000]. [32° - 26½° N.; 118° - 122½° E.]. Accompanies "Half a Century in China" by A. E. Moule, London, etc. [1911].

PALESTINE. Karte des Ostjordanlandes aufgen. von Dr. G. Schumacher, herausgeg. vom deutschen Verein zur Erforschung Palästinas. 1:63,360. Blatt A4. 32°40' - 32°25' N.; 35°30' - 35°52' E. 5 colors.

[The map of which the above is a sheet and the map on the same scale in 26 sheets published by the Palestine Exploration Fund are the standard detailed topographic maps of Palestine. The German map supplements the English map in that it represents the country east of the Jordan. Other sheets listed under "Palestine," *Bull.*, Vol. 43, 1911, p. 709.]

PERSIA. (a) Map of Persia. 1:5,000,000. 42° - 25° N.; 40° - 65° E. 7 colors.

(b) Map of Dr. Sven Hedin's Route from Teheran to Seistan. 1:1,500,000. 36° - 29½° N.; 50½° - 62½° E. Oriented N. 30° W. 7 colors.

Accompany Vols. I and II, respectively, of "Overland to India" by S. Hedin, London, 1910.

[Map (a) a general map showing Sven Hedin's routes in 1885-86, 1890-91 and 1905-06. Map (b) is

based on a reduction to 1:300,000 of the author's original manuscript map in 232 sheets. It shows his routes in 1905-06. Both maps distinguish between sand and salt deserts (*kevir*).

TIBET, BURMA, ETC. Carte du Haut-Assam. [1:13,500,000]. [31°-26° N.; 91½°-100° E.]. Accompanies on p. 135. "Les Royaumes des Neiges (Etats Himalayens)" by C.-E. Bonin, Paris, 1911. [Gives names of tribes.]

TRANSCAUCASIA. (a) Skizze des Gefechtsfeldes bei Kars (nach Greene). 1:600,000. [40°45' - 40°15' N.; 43°10' - 43°50' E.].

(b) Skizze der Ruinenstadt Ani (nach Lynch). 1:20,000. [40°30' N. and 43°40' E.]. Accompany, on pp. 45 and 61 respectively, "Durch Armenien, und der Zug Xenophons" by E. v. Hoffmeister, Leipzig and Berlin, 1911.

TURKEY IN ASIA-PERSIA, ETC. (Karte I zu v. Hoffmeisters) Durch Armenien. Eine Wanderung. Entw.: v. Hoffmeister. 1:2,000,000. [42°15' - 38°55' N.; 38°20' - 45°50' E.].

(b) (Karte II zu v. Hoffmeisters) Zug des Xenophons bis zum Schwarzen Meere. Entworfen: v. Hoffmeister. 1:4,000,000. [42½° - 31° N.; 35½° - 48½° E.].

Accompany "Durch Armenien, und der Zug Xenophons" by E. v. Hoffmeister, Leipzig and Berlin, 1911.

[Map (b) a reconstruction of the route of the Ten Thousand Greeks.]

EUROPE

ITALY. (a) The Val d'Arno as it once was [geologically]. [1:800,000]. [44°25' - 43°15' N.; 9°50' - 11°35' E.].

(b) The Trade Routes [leading to Florence]. [1:1,100,000]. [44°45' - 43°15' N.; 9°45' - 12°30' E.].

(c) Florence in her elements. [1:110,000]. [43°46' N. and 11°15' E.].

Accompany, on pp. 8-9, 44-45, and 76-77, respectively, "Florence, Past and Present" by J. W. Brown, New York, 1911.

SCOTLAND. International Map: Europe 1:1,000,000. Published at the Ordnance Survey Office, Southampton, in 1911. (1) [Sheet] North O 29: The Hebrides. Unrevised proof. 60° - 56° N.; 12° - 6° W. 10 colors. (2) North O 33: Scotland-The Highlands. Unrevised proof. 60° - 56° N.; 6° W. - 0°. 12 colors.

[Comment on these, the first two sheets of the International Map of the World on the scale of 1:1,000,000 to be published of the British Isles, will be deferred to a later number of the *Bull.*]

SWEDEN. Hydrografisk Översiktskarta öfver Sverige. 1:1,300,000. 69½° - 55½° N.; 11° - 25½° E. 13 colors. Hydrografiska byrån [Stockholm].

[Shows limits of drainage basins, distinguishing them by colors according to four size groups, viz.: less than 200 sq. km., 200 - 1,000 sq. km., 1,000 - 10,000 sq. km., more than 10,000 sq. km. Regions above tree line indicated.]

SWITZERLAND. (a) Uebersichtsplan der Stadt Zürich. 1:5,000. [47°25'12" - 47°19'8" N.; 8°28'9" - 8°35'29" E.]. 8 colors. 9 sheets. Vermessungsamt der Stadt Zürich. Sept. 1905-March 1908. Printed by Kartographia Winterthur A. G., formerly Topogr. Anstalt Winterthur: J. Schlumpf.

(b) [Two sheets of the] Uebersichtsplan der Stadt Zürich. 1:2,500. Blatt II. March 1911. Blatt XV. Oct. 1908. Vermessungsamt der Stadt Zürich. Printed by Kartographia Winterthur. A. G.

[Map (a) an exemplary map of a city and its environs. Culture is shown with the exactitude customary in cadastral maps; buildings, streets, railroads, etc., being delineated in their true proportions. In the representation of relief, however, this map is far superior to most maps of this nature. Its contours were not, as is usually the case, deduced by interpolation from the elevations of a great number of salient points; each contour was individually determined in the field by leveling and its course plotted. The resulting curves are the mathematical lines which, theoretically, contour lines are intended to be. Cf. a detailed review in *Pet. Mitt.*, Vol. 58, I, pp. 311-312. The houses are in red, public buildings in mauve, open land in buff, woods in pale green, parks, cemeteries, etc., in yellow green, drainage in blue, and contours (interval 4 meters) and supplementary hachures in brown.]

The two sheets listed under (b) are parts of the cadastral map of Zurich on a scale twice as large as the map listed under (a). In execution the same: contour interval 2 meters.]

WORLD AND LARGER PARTS

MEDITERRANEAN REGION AND THE NEAR EAST. Region of the Mediterranean and Near East. 1:4,000,000. 50° - 24° N.; 14° - 61° E. 12 colors. With "Index to Ports on Mediterranean, Black and Caspian Seas." In 2 sheets. G. W. Bacon & Co., Ltd., London.

[Usual type of map with political coloring. Steamship routes and navigable courses of rivers shown.]

OTTOMAN EMPIRE. Wand-Karte des Osmanischen Reiches von W. von Diest, Oberst a.D. und Dr. M. Groll, Lector an der Universität Berlin. 1:1,250,000. 45½° - 28½° N.; 18½° - 51½° E. 7 colors. With 2 insets: (1) Das Osmanische Reich mit seinen Nachbar-Ländern. 1:10,000,000. 48½° - 10° N.; 5° W. - 78° E. 6 colors. (2) Religionskarte der Erde. Mercator's projection [equatorial scale: 1:182,000,000]. 6 colors. In 4 sheets. Gea-Verlag, Berlin, 1911.

[An excellent wall map drawn with the bold generalization necessary to insure legibility at a distance. The map is in physical coloring; it does not, however, use the usual green for the lowlands, the color scheme ranging from gray by way of light brown to darker brown; relief is in generalized shading. Railroads (different symbols for standard and narrow gauge) and steamship lines in red; roads (separate symbols for main roads and caravan routes) and telegraph lines in black; boundaries in green; nomenclature as far as possible in Turkish. The qualifications of the two compilers insure both regional and cartographic excellence.]

HISTORICAL

CEYLON. A New Map of the Kingdom of Candy Uda in the Island of Ceylon. [1:1,300,000. Scale incorrectly given as 1:400,000 approx.]. [Facsimile. 1681.] Accompanies "An Historical Relation of Ceylon, etc." by R. Knox, Glasgow, 1911.